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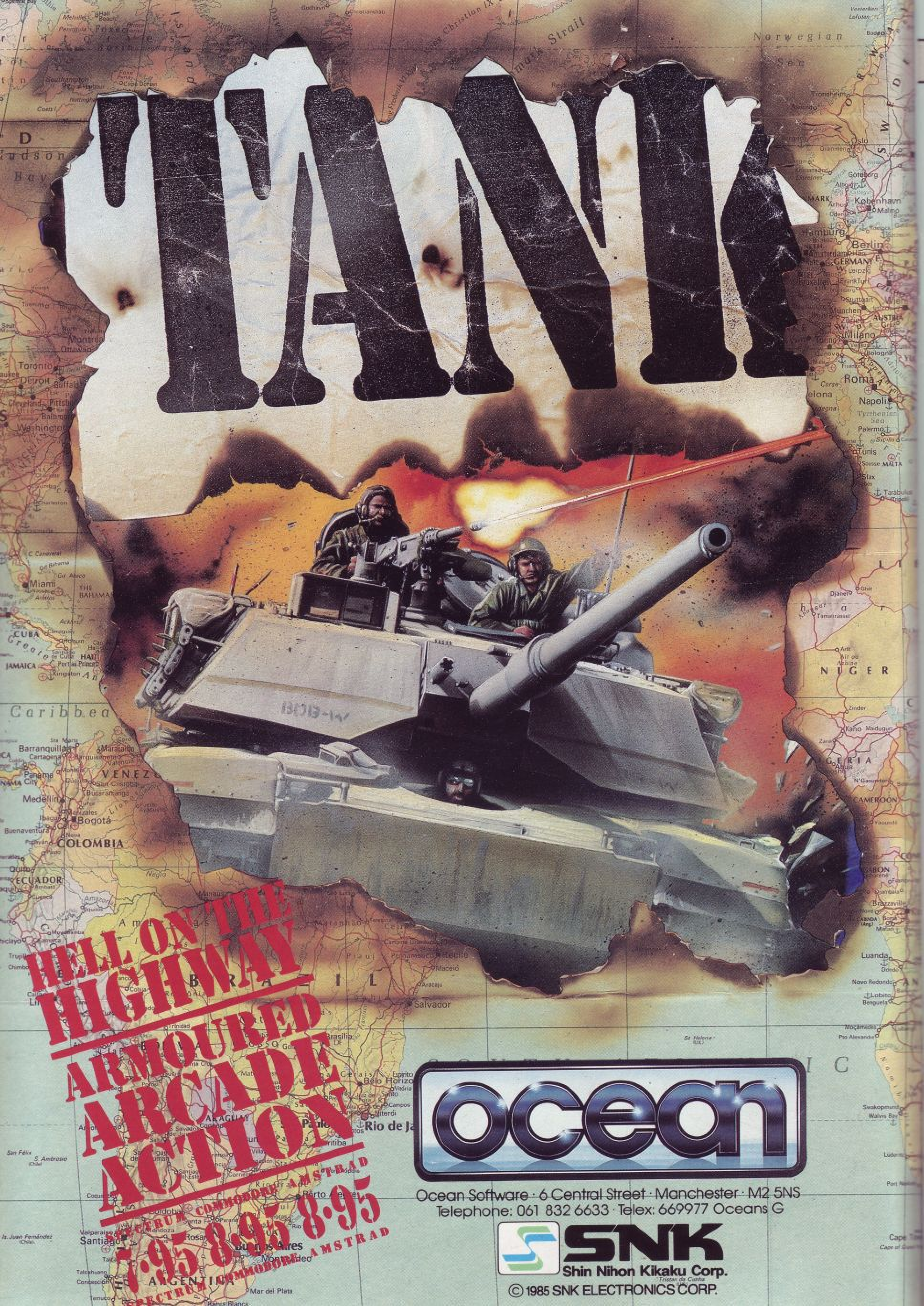
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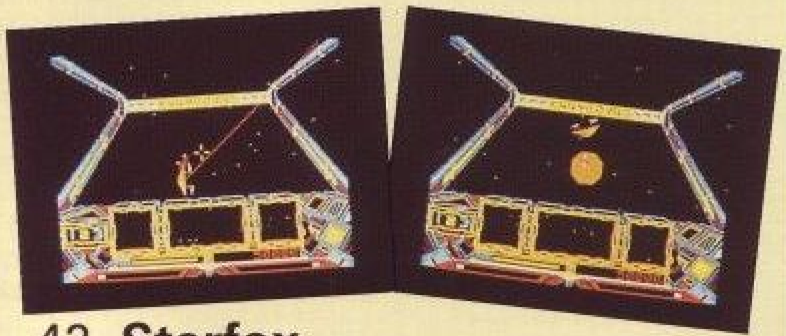


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AMSTRAD COMPUTER USER

The official magazine for all users of Amstrad computers

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Amstrad launches new PC

Amstrad has finally unveiled the PC 1640 ECD range of IBM compatible PCs. The existing range of PC 1512s will continue, with the new 1640 costing a bit more.

The PC 1512 has been criticised for its inability to accept an Extended Graphics Adaptor (EGA). The PC 1640 offers original EGA as standard. Three models will be available, although initial shipments will only feature the top of the range systems.

The PC MD has a Hercules graphics card compatible monochrome resolution of 720 by 350 and the PC CD has three graphics modes offering 16 colours with a resolution of 640 by 200, two colours at the same resolution and a standard IBM mode of four colours in a 320 by 200 mode.

The most expensive machine is the PC ECD. This provides four graphics modes, 16 colours from a palette of 64 at a resolution of 640 by 350, 16 colours at 640 by 200, monochrome 640 by 200 and again the standard IBM four colours at 320 by 200.

These standard graphics options have resulted in the omission of the 1512's special 16 colour mode. The PC 1512 was unusual in offering two operating systems, Dos+ from Digital Research lived in the shadow of MSdos and has been dropped from the system discs supplied with the 1640.

Otherwise the 1640 is much like the 1512. It has a Microsoft mouse as standard, an 8Mhz 8086 and a good deal of bundled software. MSdos and Gem have been retained, along with Locomotive Software's Basic2.

The prices reflect the added cost of the high quality monitor. No details of the PC MD or PC CD were available at the time of going to press, but the ECD prices are:

The single drive floppy system costs £99 and with an extra drive £100 more. The very top of the range 20Mb hard disc will set you back £1199. This may sound a lot more expensive than the existing 1512 range, but the comparison is not really fair. An EGA board for other makes of PC often costs £150, and a good monitor is very expensive.

Amstrad have gone to great lengths to appease large companies by including two fans and a three wire mains lead with the new machine.



Amstrad's latest, the PC 1640

New faces at the big show

THE Amstrad show has been a complete sellout to exhibitors.

The demand from companies has been so great that organiser Database Exhibitions has been forced to add 14 additional stands to the original 80.

Even this has left more than 20 would-be exhibitors waiting in the hope that someone will drop out before the opening of the three-day event on July 10.

"We've tried our best to accommodate people but unfortunately a number are going to be disappointed", says Derek Meakin, head of Database Exhibitions.

All this in spite of the fact that the organisers moved the show from the Novotel to Alexandra Palace to provide an additional 50 per cent of exhibition space.

It still fell far short of meeting the overwhelming demand. This has been partly due to companies who have only recently jumped on the Amstrad bandwaggon. Almost 25 per cent of the exhibitors this time will be attending their first Amstrad show. *Details: Page 10.*

Bond motors on



The new James Bond film has been turned into an excellent game by Domark, and from what we've seen of The Living Daylights this game is gonna be a biggie.

Programmed by Design Design, it has a three level scroll, a dynamic 007 who runs, jumps and tumbles, a helicopter and exploding milk bottles.

In the new film James Bond drives an Aston Martin, an appropriate choice since that is the same make of car as he drove in the early books. He also had a penchant for big expensive Bentleys, like the Mark II Continental he drove in the Thunderball novel.

Still, 70 grands worth of Aston Martin Vantage is no mean mode of transport, especially when Q has added those little extras like lasers and skis And if you look carefully you can see the missiles to either side of the number plate.

The young pretenders sitting in the photo are the software slones Dominic and Mark, bosses of Domark – Britain's yuppiest software house. Look out for more details in next month's *ACU*.



And this month's silly picture from Ariolasoft . . .

. . . is to promote The Bride of Frankenstein, not related to CRL's game titled simply Frankenstein. Ariolasoft should be concentrating on Starfox, the amazing new game reviewed in this issue.

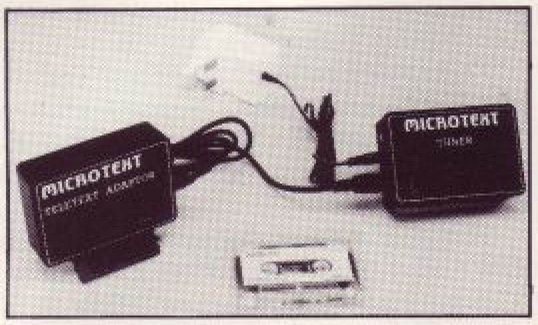
Joystick does the splits

We often get new gizmos in the office, but it is rare that one is put straight into service and stays there. This month a peripheral has won the accolade of being installed on the CPC 464 behind the editor's desk.

The Joycon is a splitter which allows you to run two standard joysticks with an Arnold. It is available from FREL Ltd who are on 0584 4894.

Teletext for Arnold

Microtext have been producing a CPC teletext adapter for quite a while. Until now it has required a video recorder to receive the signal, then the Microtext adapter has done the rest of the work to



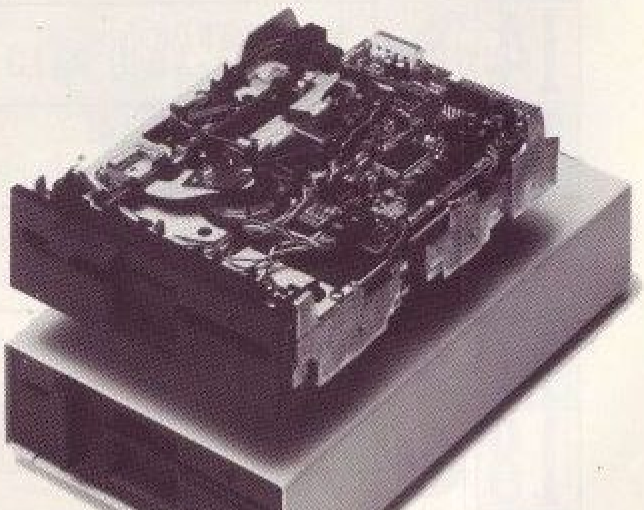
pull out the binary bits.

Now Microtext has launched a tuner. Which will allow you to connect your Arnold to the airwaves sans-video.

Remember you will need a TV licence just to use this, even if you don't have a television. The tuner costs £48.85, and the whole package will set you back £114.80. For more details call Microtext on 0705 595694



You may get a nasty result without a Mitsubishi Disk Drive



Using second-rate components can make your hardware bite back. Over the past three years we at Mitsubishi have sold over a million disk drives; a record that makes us very much number one in the market. But we don't impress just on quantity. There's quality too.

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So it's hardly surprising that the list of companies using our disk drives reads like a who's who of personal computer manufacturers. So don't get a mega-bite, ask for Mitsubishi by name.

Another example of Electronics from Mitsubishi.

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GALLUP SOFTWARE CHART

Pos	Move	Title / Publisher / Price	Comment	Last month	Market strength
1	Up	**Grand Prix Simulator** *Code Masters* £1.99	Yipee, after three months of predicting this chart position GP Sim is up where it belongs. Super Sprint by any other name would still play as sweet. This is a bargain.	3	100
2	Down	**BMX Simulator** *Code Masters* £1.99	Cycling simulator best played with a friend, a good, fun game with a low price but not the best buy around.	1	94
3	Down	**Six Pak** *Hit Pak* £9.99	Proving that compilations are as popular as ever this has scorched a trail into the chart and can be expected to hold on in there for some time.	2	75
4	Non-mover	**Feud** *Bulldog* £1.99	First game on Mastertronic's new label. Chunky sprites and a mystic plot go to make up this 2D arcade game.	4	69
5	Non-mover	**Big 4** *Durell* £9.95	Top notch compilation of two excellent games, one good game and a totally new program. With this kind of value it is a surprise that Big 4 has tumbled so far from number 1.	5	61
6	Non-mover	**Ninja** *Mastertronic* £1.99	The fist fiends fight on. This time more viciously and at a lower price. You have you to fight off the hordes using a variety of weapons.	6	54
7	Up	**Five Star Games** *Beau Jolly* £9.95	Another compilation which is doing an admirable job of hanging in the chart. Spindizzy makes this a classic compilation.	20	53
8	Up	**Head over Heels** *Ocean* £8.95	Hours of entertainment make this a bargain, deserves a top five place at least. Very difficult but shows a good sense of humour. The next game from Jon Ritman will be a Match Day sequel.	15	52
9	Non-mover	**Gauntlet** *US Gold* £9.99	The only reason for this falling in the charts is that everyone has got a copy. If you haven't then your software library is incomplete. Go and buy Gauntlet.	9	50
10	Non-mover	**Four great games** *Micro Value* £3.99	A cheapie compilation. To think that some people thought that budget software would see the death of the games industry. Still if they are such great games, why sell them at less that a quid each?	10	49
11	Non-mover	**Football manager** *Addictive* £2.99	Just think – if you hadn't bought Football Manager all those months ago you would have saved a few bob. Still, you have given it a good run.	11	48
12	Down	**Konami's Coin Op Hits** *Imagine* £9.95	Take the best from the arcades into your home. Green Beret, Ping Pong, Hypersports, Mikie and the splendid Yie Ar Kung-Fu.	7	43
13	Down	**180** *Mastertronic* £1.99	Digital darts: You can't use the excuse that you need to steady your hand when you practice this non-intoxicating bar-room skill.	8	38
14	Non-mover	**Mini Office II** *Database* £14.95	Longstanding chart runner. A full suite of business programs for the price of a game. Ideal first look at sensible software but lacks the power for major applications.	14	37
15	New entry	**Army Moves** *Imagine* £9.95	The first Imagine game to result from a deal with the Spanish software house Dinamic. Bouncing buggies and 2D graphics.	ne	35
16	New entry	**Computer Hits 5** *Beau Jolly* £6.95	Yawn another compilation. Old games never die, they just get remastered. Still if they sell...	ne	34
17	Down	**Five-a-side soccer** *Mastertronic* £1.99	Football games have been around since the days of pong. Now a cheapie for the CPC keeps the trend alive.	13	32
18	New entry	**Take 4** *Gremlin Graphics* £4.99	A superb tape from Gremlin Graphics, the £4.99 price has been decided upon to offer something between full price games and budget. An interesting experiment.	ne	32
19	Down	**Deeper Dungeons** *US Gold* £4.99	So everyone *has* got a copy of Gauntlet, and they are still playing it. More mazes and nastier nasties. Good to see that US Gold is not charging too much either.	12	31
20	New entry	**Chronos** *Mastertronic* £1.99	Smooth scroll space shoot-'em-up. An interesting way to spend a rainy Sunday afternoon. Not exactly Mastertronic's finest hour, but a good staple game.	ne	30

Non-mover · Up · Down · New entry

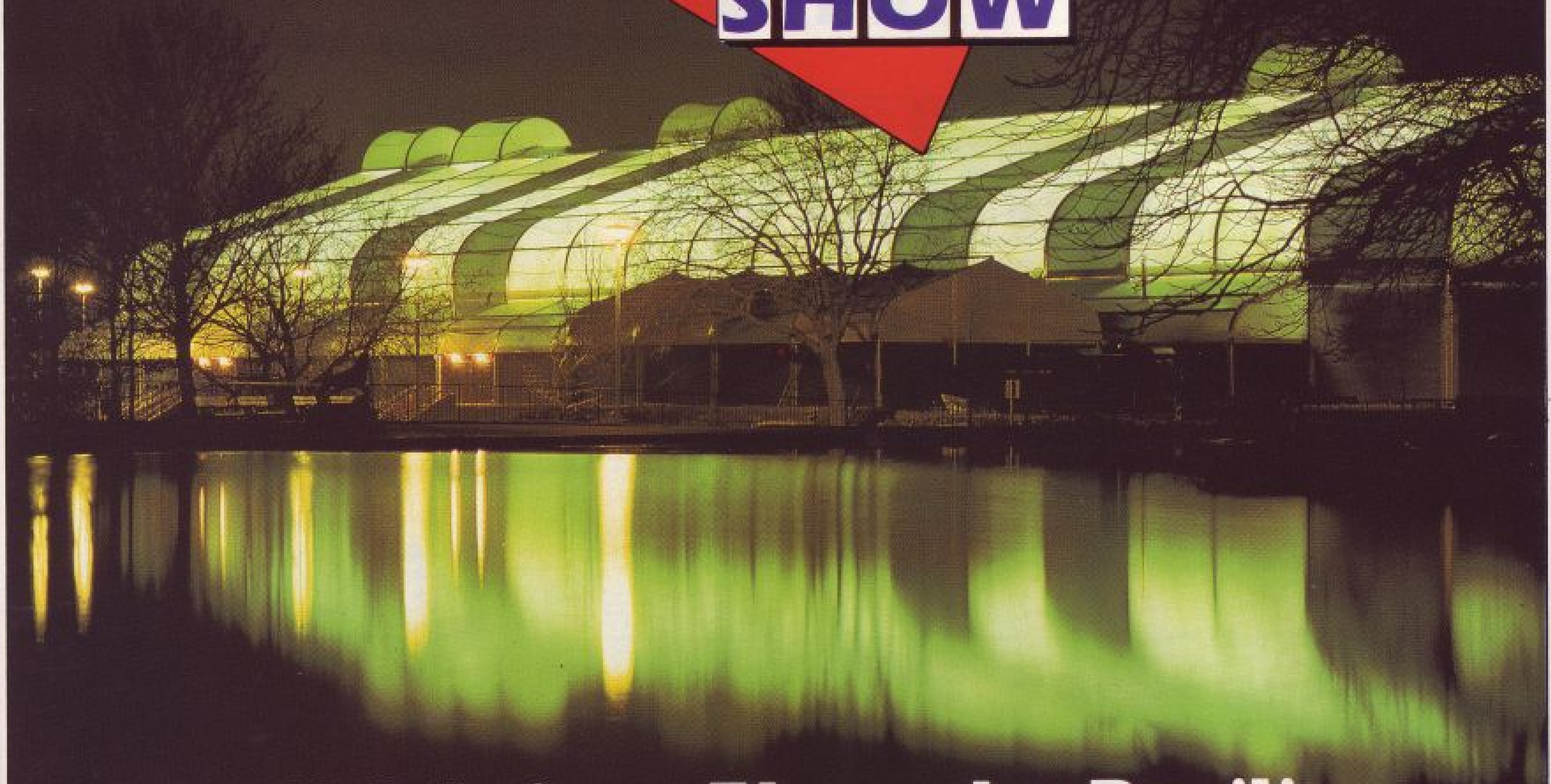
JULY 1987

Chart compiled by Gallup/MicroScope

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Hi, I'm Lance Davis, your letters editor. If there is anything you think Amstrad computer users ought to know about then drop me a line. I can't deal with individual problems and this isn't really the place for programming tuition but it is the place for bouquets and brickbats, views and opinions. Write to me at the address in the front of the magazine or on Telecom Gold System 72:mag012. Remember that some writers will be sent free software, so let me know which computer you have.



Native network

My family has owned an Amstrad green screen CPC6128 for 15 months now. I bought the cheapest disc version, not knowing if my wife and children would take to a computer – I have been using various models at work for several years.

We soon bought a modulator to make use of colour with a television set and four months later we acquired a PCW8512, with a view to serious work such as programming, word processing of various kinds – especially for help with the children's education – and the use of the attached printer, and twin disc-drive for file transfers. We have been very pleased with their performance and value for money.

However, the picture quality on the colour television was not as sharp as on a colour monitor, so we have just bought a colour screen CPC 6128 as well.

Is it possible to link two CPC 6128s so that the disc-drive of one machine can be used as the second drive of the other, and vice versa? This would provide similar ease of file transfer as the PCW8512. If this may be done, what cables and so on are required?

T.J. Clark,
Guildford, Surrey.

***LD:** You cannot share disc drives between machines, but you can use the two drives of the PCW to copy CPC discs. You will need to copy from drive B to drive A, but the PCW is perfectly capable of creating 6128 readable discs, if they have been formatted on a 6128 first.*

Printer poser

I think your mag is neat. Please keep it up. For being the best of all the best Arnold mags, I have sent you Arnold the Android, a miniature paperweight I made.

I have only one complaint: Please could you have a page with short listings, for us kids who can't type in the longer listings? Changing the subject, I want to buy a small printer, for printing listings – I have a CPC464. Which one do you recommend?

Shabaz Yousaf,
Slough, Berkshire.

***LD:** You could do a lot worse than the Amstrad DMP-2000. It's cheap and quite good. If you want to move up-market look at a Panasonic.*

Upwardly compatible

I recently ordered a bundle of 10 back issues, from March to December 1985. When they arrived I was very pleased with them, but found the first three were for the CPC464. I own a 6128 – will the listings work?

Deborah Allison,
Blackheath, London.

***LD:** All the 464 listings in ACU will work on a 6128, except Pak Caverns – the FRAME command should be changed to FRA to work on the 6128.*

Manual control

I own a CPC464 with a DDI-1 disc drive and am just starting to get to grips with machine code. I've been advised to buy a copy of the Firmware Guide, which seems like a sensible idea, and in fact I've already been given a copy of SOFT 158A (the firmware guide for the DDI-1).

Now that there is a choice between SOFT 158 (CPC464 firmware) and SOFT 968 (CPC464/664/6128 firmware) I'm not sure which one to get. Since I would hope to own a 6128 one day it would be sensible to get a copy of SOFT 968.

However, my interest at the moment is obviously in the 464 so I really need to know whether there is anything in SOFT 158 that isn't in SOFT 968.

Can you please help me with my decision since, at nearly £20 a copy, getting the wrong guide would be an expensive mistake.

J.Colebourne,
Camberley, Surrey.

***LD:** SOFT 968 is simply SOFT 158 plus 158a with a bit of extra info thrown in for free. I would recommend that you buy 968: All the 464 stuff is in there and it is a newer revision.*



Turkish delight

I have sent you five letters in the last year, but received no reply. I had used the phrase "I'm a Turkish CPC464 owner" in the five letters: This time I want to add the words "manic-depres(sed) and neglected". I have seen letters even people from Singapore wrote but no Turkishman till my fellow countryman Mr Catintas.

I'm also a model-maker (Airfix-Tamiya) and so far I have managed to amass a large number of them. I want to store information about them so that I can refer to it later or send it to others as hard-copies. I'm looking forward to your readers' letters.

By the way, a little help to Vax. In Ocean's Bruce Lee, in the first group of three rooms (the ones you collect the lamps to get the hatch opened) in the last room, if you lie down just when Ninja is about to hit you when you are near the right hand wall transfers you to the other side of the wall.

Later, if you don't lose your nine lives, and pick the twin-balls in the floor of the maze (which gives you a bonus life), you receive 99 lives.

This is the only thing I can write in return for your help. (Well Mum will be pleased to see my name, if you publish it). And please keep your magazine going, it's the best for Arnold!

Ozgur Altinyay,
Turkey.

LD: *I would recommend Masterfile to store records of your models. Thanks for the Bruce Lee tip.*

Name dropper

Here is a little story for you. As BRUCE LEE was running along under the RED MOON he saw a FLY SPY and killed it with his KANE. Suddenly SPIKEY HAROLD said he was going to THRUST JET-SET WILLY II on ALIENS world.

Nobody took any notice of him so he got a TOP GUN and BREAK-THRU a bank vault and got some BATTY to buy a SPACE HARRIER, so he could fly to the planet FROST BYTE and cause the GHOSTS + GOBLINS to have a FEUD with the KUNG FU MASTER.

After a day's work it was KNIGHT TYME so he decided to STORM home in his FORMULA ONE SIMULATOR so he could watch the FIVE-A-SIDE SOCCER.

Craig Wilson,
Hull.

LD: *I liked the idea behind your letter: A free game, of my choice, to the best one like it by the end of August. Maximum 150 words.*



The guessing game

A rival computer magazine stated last month that Amstrad is going to release a games-console later this year.

The magazine's sources claim that: "the console will use the sophisticated 68000 processor found in upmarket computers like the Atari ST and the CBM Amiga. This will allow it to run arcade games with the graphics and sound features of the coin-op originals. Apparently there are no plans to supply the console with a keyboard. It is expected to cost under £100 and come with some software and a joystick".

Could you please try to verify this claim, and if it is true, will its presence affect the life of our beloved CPCs?

More rumours now. A friend of mine says that Amstrad is going to release some additions to its PC and PCW range of computers later this year. Is he right, or has he been at those mushrooms again?

Jason Anderson,
Swansea.

LD: *I suspect it is the rival magazine which has been at the mushrooms. Amstrad has shown a new PC in America, but your letter arrived before that. Does your friend study form? Who does he recommend for the 3.45 at Epsom?*

Word processor recommendation

Looking around the market for a word processor package to suit my 6128, I decided upon Brunword from Brunning Software.

I wish to pass on to your readers that in my opinion it is excellent value for money (£25 all in, including a £5 refund if introducing anybody) and anyone thinking of buying a word processor package (for a 464, 664 or 6128) should give serious thought to it.

It is simple to use, has a built in spelling checker/dictionary, datafile/card filing program and many features usually found only on expensive packages.

Full details are provided in a free booklet from Brunning Software (0245 252854) and I am sure when you compare it with other packages you will realise what a good buy it is.

N.A.B. White,
Shepperton, Middlesex.

LD: *When I saw Brunword I was unimpressed, but then it is pretty cheap. Protext in rom remains my favourite CPC text editor.*

The truth about TELEX

How much does it cost to go on Telex?

You could go the conventional way and buy a dedicated Telex machine. The cheapest will cost you £1,604 (the Whisper), the dearest £2,892 (the Cheetah). You will also need a separate telephone line, costing £101 to install, plus £404 a year rental. That's a total outlay over the first year of a minimum of £2,109. (All prices include VAT.)

Or you could do what more and more Amstrad users are doing – use your computer to double as a Telex machine. And just use your ordinary telephone!

How do I turn my Amstrad into a Telex machine?

All you need is a modem and appropriate communications software (see the advertisements in this issue), a telephone, and a subscription to *MicroLink*.

Telex is just one of a growing number of services available to Amstrad users on *MicroLink*. With it you can also read the news as it happens, go teleshopping, create your own closed user group, send telemessages and electronic mail right round the world, download free telesoftware programs directly into your micro . . . and much more.

But why use Telex?

Because it's a standard means of instant communication between businesses. Today there are 150,000 Telex machines in use in Britain – and more than 2 million worldwide. It's to dramatically speed up business communications – just as quick as using the phone but far more efficient, because you have a hard copy of every "conversation" for your records.

But there's a big bonus you get when you use *MicroLink* for Telex that the conventional way doesn't offer.

With *MicroLink* you don't HAVE to be in your office to send or receive Telex messages. You can just as easily use your computer at home (or even a portable). So now you can check whether there are any Telex messages waiting for you – anywhere, anytime. How's that for your business efficiency?

How to join: See Page 24

Index wanted

I have subscribed to *ACU* for quite some time now and feel I must write to congratulate the editorial staff.

I should add that I detest crawling – particularly when *ACU* would have us believe that the letters editor resembles a bequilled (is that the word?) rodent of doubtful intelligence – but was always brought up to believe that credit, where due, should be given freely. The possibility of a free disc (6128 if you're interested) is irrelevant.

In addition, my comments above are in fact closely related to the point of my letter. "There is a point to this letter?" cry the crowd. Oh yes indeed, says I.

You see, since *ACU* forms such a useful library of articles relating to my type of computer it is well worth collecting, but it is almost impossible to find a half-remembered piece that suddenly becomes relevant.

The program for a simple database is a good example: Pokes for games that I did not own when they were printed is another. My suggestion is that an index is produced every six months or so detailing the contents of the last six issues of *ACU*.

I appreciate that financial considerations would be important but I feel that such information could probably be incorporated into the Newsheet for a nominal fee.

Finally, on a more serious note: Why did the Letters Editor cross the road? Because he wanted to see his flat-mate!

Andy T.Harper,
Renfrewshire.

LD: *Do you realise how much work it would be to catalogue three years copies of* ACU? *If anyone wants to do the job...*



Disc upgrade

I read some while ago that to assist buyers of disc drives Amsoft would replace tape versions of their programs with disc versions for the cost of the disc.

I recently telephoned Amsoft and spoke to a man who evidently had little knowledge of computing. Although he said that my program called Invostat could be copied on to a disc for £5 he was unable to understand that merely copying it would be useless. This is because it employs tape routines which if copied on to disc would still try to run on the tape.

I should be very grateful if you could advise me what the situation really is. And if there is a solution, how I can achieve it if it involves Amsoft?

Tony Glazier,
London.

LD: *In this case, Invostat tape and Invostat disc are different programs. I remember the Amsoft offer, but that was made in the early days of disc drives when many people were upgrading. I suspect it is now closed.*

Sixteen bit CPC?

I note from the technical press that Zilog, manufacturer of the famous Z80 microprocessor incorporated in CPC computers has officially announced a new microprocessor called the Z280.

The new chip would appear to be fully upwards compatible with existing software and therefore provides some intriguing possibilities for a successor to the CPC range.

The possibility arises of having 16 bit processing power (instead of 8 bit), memory addressing capability of 16Mb (instead of 64k) plus a host of extra facilities, and still being able to run all the existing CPC basic software.

I appreciate that Mr Sugar is not going to advertise his intentions for new products, but it would be nice to think that all my programming effort need not be ditched if ever I want a machine with more than 64k of useable program space.

J.Fairlie,
Bristol.

LD: *I wish, I wish, I wish. I fear in vain.*

Dump power

May I take this opportunity of seeking your advice regarding the Amstrad CPC 6128 which I have recently bought for use with a Canon PW-1080A printer? I wish to be able to write programs in Basic to produce hard copy graphics, using plot and draw commands.

Whereas it was a simple process to reproduce the graphs through the printer using a Sinclair 48k machine, I find it impossible to do the same thing on the Amstrad.

I am aware that there are specific graphics programs which enable this to be done, but most of the things that I want a program to do require that I write my own simple Basic program.

I presume that the GSX software somehow enables the printing of graphics, but I am unable to fathom how. I should be grateful if you would give me guidance on this which surely should be quite a simple matter.

K.D.Williams,
Chichester, West Sussex.

LD: *The simplest way around this, albeit pricey is to buy the Utopia rom from Arnor. Whenever you want to copy a screen type BARGDUMP.*

RTFM

I would like to know how to shift the contents of a numeric variable into a string variable. I can put a string variable, provided it contains only numbers, into a numeric variable using this command:

LET (NUMERIC VARIABLE)=VAL((STRING VARIABLE))

but not the other way round. I own a CPC6128 with colour monitor.

Samuel Hopkins,
Tooting Bec, London.

LD: *You need to use the Basic command STR$. Like this:*

```
LET (STRING VARIABLE)
=STR$((NUMERIC VARIABLE))
```

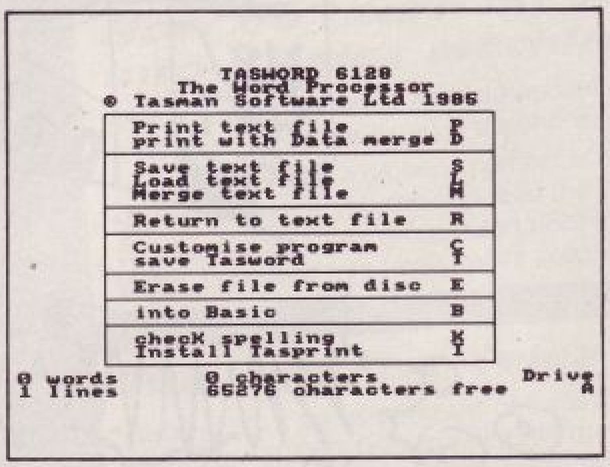
Interestingly enough Sir Clive Sinclair's new company claims that this is the command which suffers from a bug in the new Z88 portable computer.

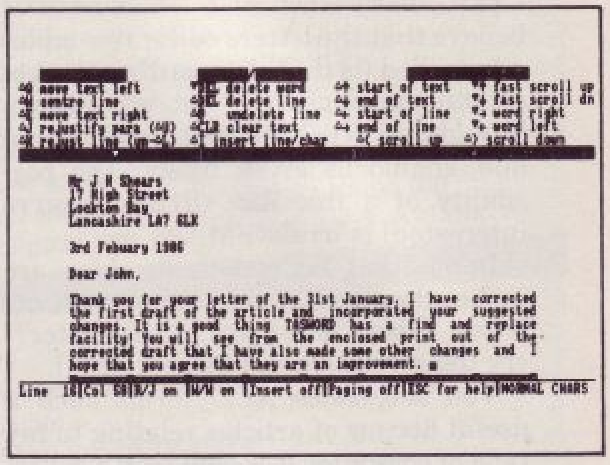
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TASWORD 6128

THE WORD PROCESSOR FOR THE AMSTRAD CPC 6128







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The illustrations on this page are reduced from full-size TAS-SIGN output.

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Adventurer's Guide



Seek and ye shall find..

Into adventures with Bill Brock

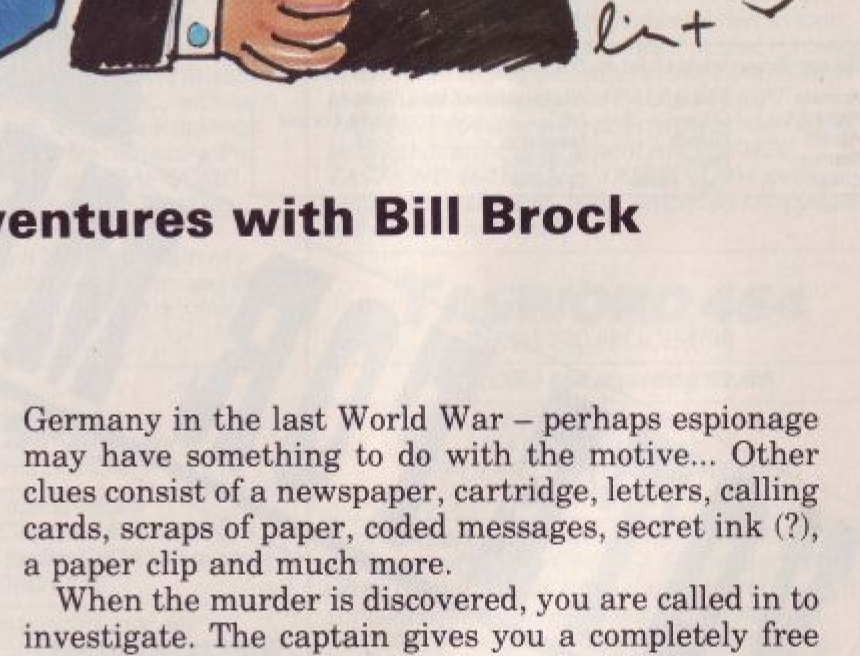
American software house Infocom, has for a long time given us some excellent adventures. Recently these have included a selection of extra goodies to make the product more memorable. Whether they have materially added to the playing of the games is debatable, but they have certainly added to the atmosphere.

On this side of the big water, software houses have occasionally treated us to additional material, usually in the form of extra reading matter. Now, from France, Infogrammes' latest adventure gives us a range of extras that will surely take some beating. The game is basically a detective story and nearly every clue found in the game is also found in the box. Murder on the Atlantic is available for Amstrad CPC machines on both tape and disc.

All the action, as the title might suggest, takes place somewhere in the middle of the Atlantic – on a luxury liner. The year is 1938 and the first crime you are investigating is the murder of a French national, one Philippe De La Valliere, a notable pilot supposedly travelling to America to make an attempt on the world speed record flying from New York to Paris. He was quite a ladies man, and would also appear to have worked for the French Deuxieme Bureau.

The many clues include two very small negatives (taken with a spy camera?). These are of the now famous Enigma coding/decoding machine, used by Germany in the last World War – perhaps espionage may have something to do with the motive... Other clues consist of a newspaper, cartridge, letters, calling cards, scraps of paper, coded messages, secret ink (?), a paper clip and much more.

When the murder is discovered, you are called in to investigate. The captain gives you a completely free hand and you must travel all over the SS Bourgogne searching for clues and interviewing potential suspects. The screen displays a side view of the ship with a flashing cursor (one pixel) that represents your present position. There are two further windows



beneath this plan that display a picture of your location and anyone you are interrogating, together with a description of what you may find or the text of any statement made to you.

With 40 different people to interview and several hundred locations to visit your task is not easy.

You move around using the cursor arrow keys, although the vertical keys only work where there is a staircase and these are not shown – try the deck storage rooms for starters. The other method of vertical travel is by the two main lifts.

The instructions recommend that you follow standard police practice and record all the information you discover in a notebook. Heed this advice – there is a wealth of data waiting for you to sift through. There is a passenger manifest to help you decide who should be in each cabin, and to aid recognition the package provides small reproductions of the screen pictures to stick on the pages of your notebook.

As you move from location to location, you press COPY to see where you are and F to search for any clues. If someone is present, you interrogate them and obtain a statement. Initially you may well see the message TOO EARLY, which simply means that you need further evidence from elsewhere to trigger off the right response. It is well worth noting where these people are on a plan of the ship (also provided), so that when further questioning becomes necessary you know where to find them.

To keep you on your toes there are a number of places where you will be asked a question. For example, you may find a scrap of paper and be asked what it is. The correct answer enables you to take another step forward in the investigation.

As you can imagine, this game is not going to be solved very quickly. To save the game position and the progress made to date, you must create a State Inquiry file. If at this time you feel you know all the answers, you can run the TEST program. This will ask you various questions to judge your progress. Although this is written in Basic, listing it will not help you cheat your way to success.

There is also a message that your computer will have to decode. This appears at first to be quite a programming problem, but don't panic – all the clues are there. Just remain calm and read the instructions again when the need arises.

The game tape or disc has a copy of the coded message on it, so you will not have to type in the message that you find among the evidence. First load this into the Amstrad's memory with the following:

```
MEMORY 29999 : LOAD "CODE.BIN",30000.
```

Now, if you PEEK at memory locations 30000 to 31921, you will find the Ascii codes for the symbols in the coded message. To decode it, you will have to write a small program using the algorithm (formula) you find in your investigations – happy programming!

If you can, buy the disc version. There is a lot of program to this game and each interrogation accesses the disc for information. If you have the cassette version you will have to take careful note of the counter readings to get the tape into the right position to load in the required data without having to wait ages at each interview.



Comic relief

We have had adventures based on books, on films and on radio programs, and it has always surprised me that we have not had more games based on comic books. They would seem to be the ideal base for graphic adventures, as the pictures already exist in a simplified form ready for transposing to our screens. Although we do have a number of comics produced in this country, the most popular ones are of American origin.

In France they have a flourishing comic book industry – the emphasis is on the word book, as they are nearly all hard cover productions. *Bande Dessus,* as they are known by our Gallic friends, come in all



varieties from the purely erotic right through to Tin-Tin and his friends.

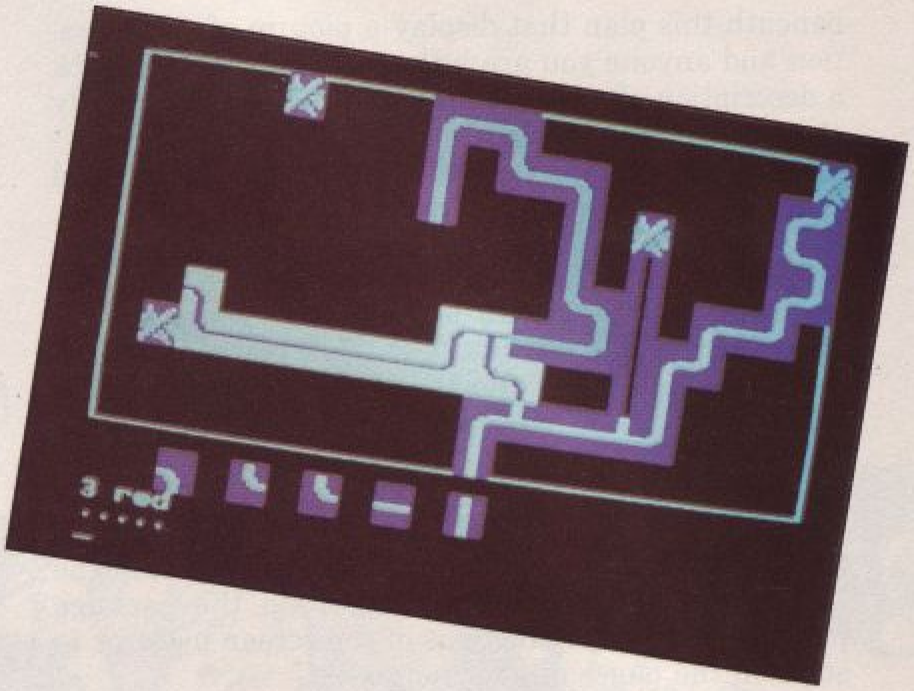
It is interesting to note that whereas American comics are nearly all about beings with superhuman powers, the French have very few of these. Many are based on or around historical events, and quite a few are thinly veiled history books intended to educate as well as excite.

One very famous French comic series is Passengers on the Wind. The story to date is long and somewhat involved, but revolves around two girls who are unrelated but who could be taken as twins. One, Isa, is the daughter of a rich nobleman, the other an orphan taken into the family as a companion. They

often have fun by swapping identities. On one critical day they exchange places and the daughter is sent to a convent while the "friend" is treated like royalty by the father.

Some time later they meet again and run off together, only to end up aboard a boat that is involved in a naval action with the English. The "friend" dies and Isa and two French friends are captured. Isa is permitted to become a tutor to an English girl but the others are imprisoned. She is determined to free them and also to prove her birthright... it is at this point that the computer adventure starts.

The game is distributed by Infogrames and runs on





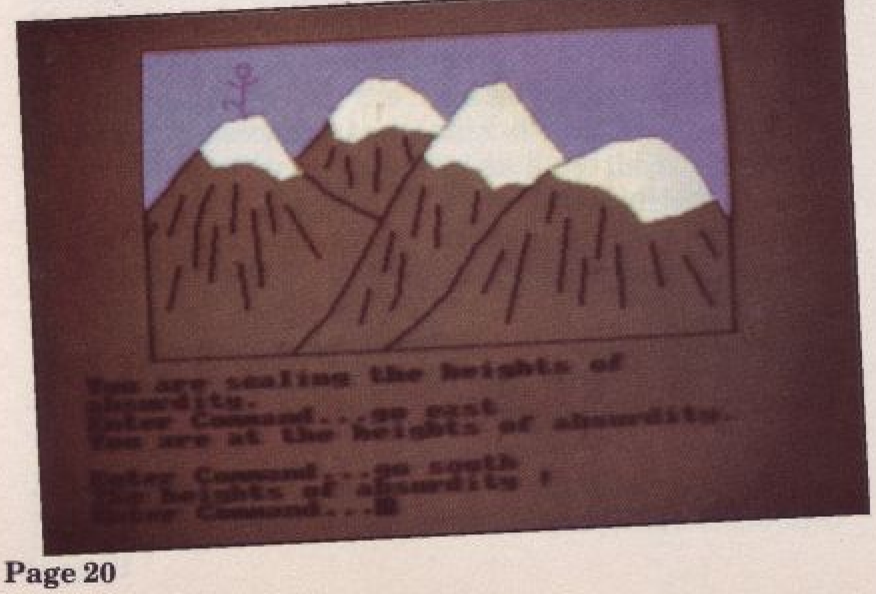
CPC and PC1512 machines: Both tape and disc versions are available for the CPC. The colour graphics are very good indeed on the CPC version., but the PC1512 has only black and white pictures which are not to the same standard.

The main scene appears across the top of the screen, one window below this displaying a picture of who is talking and a second the text. The game may be controlled either by joystick or from the keyboard. Different people present may be selected to talk and sometimes it is the order in which you get their responses that directs the course of the story.

The game takes place in nine consecutive episodes, some of which appear to have foregone conclusions. I would recommend you to save the game position on entering each new episode, as you will have to start from the very beginning if you fail to win through.

The puzzles are not that difficult to solve. So, although the graphics and background music are good, and the story likely to hold your attention, the game is not going to take you too long to finish. This must then raise the question of whether you will want to play the game/read the story again? I hope so, because I think there is a lot of potential in products of this type.





Cheeky or tasteless?

New from Atlantis Software is a title that should appeal to fantasy adventure fanatics – Dungeons Amethysts Alchemists 'n' Everythin'. I say should, but I feel your best option is to ignore it completely. It has a disclaimer on the inlay saying that it is "not suitable for persons under the age of 16", and inside a warning that it contains sexual innuendos that may be offensive. Also expressed is the hope that most people will see it as "cheeky fun".

Well, I suppose that it does have a few innuendos: It certainly does not have much of a plot. There are very few locations and the puzzles are simple, with only eight items needed to be found to finish the game. The program is written using our old friend GAC, but the authors have not paid a great deal of attention to how the words are presented, with the layout and isolated

punctuation marks giving a general feeling of sloppiness.

I'm certainly not against the occasional light hearted, sexy or madcap romp. There have been a number of successful games that could be classed as such – but they were well written and well thought out. This is not one of them: It is cheap (£1.99) but definitely tacky. Atlantis can certainly do better than this.

More bookware

Definitely well written and presented, Nine Princes in Amber is sadly only available for Amstrad PC1512 owners. It is published by Telarium and based on the book of the same name by Roger Zelazny. As said before in this column, Telarium specialises in adventure games based on books by prominent authors in the space and fantasy fields. The game has been out for quite some time and for fantasy buffs (and others) is highly recommended.

The story line follows the book fairly closely. It concerns the awakening of Corwin to the realisation that he is not a normal run-of-the-mill human being but a member of the royal family from the world of Amber, a family able to shape worlds to their own needs. They also have a range of powers amplified by special decks of cards that resemble the fortune telling Tarot pack.

The family has been kept in check by an autocratic father for many years, but the king has now disappeared and the rivalry between the many sons and daughters is verging on outright war. Corwin wakes up in a hospital bed in North America, having been in a motor accident. He does not know who or what he is, and the story unfolds from there.

This is not an adventure that requires careful mapping at all times. Solving the many puzzles automatically puts you on the path that you have determined. This is not necessarily the right path, as you will discover fairly rapidly.

Corwin makes his way to the world of Amber with the aid of Random, one of his brothers. There, one of the first things he has to do is "walk the Pattern". This is a mystical ritual that, if successfully completed, will restore his memory and some of his powers.

This is an interesting addition to the normal adventure game. You attempt to create a pattern of lines that join five bases without crossing a previous path. You are kept supplied with five semi-random pieces of basic pattern that you may choose from to add to your path. There is no time limit and once you have learnt the rules, this is a fairly easy operation. I found it quite addictive and had several goes, trying to use less pieces than in previous attempts.

The graphics are good, but limited somewhat by the basic IBM palette. The intermittent music suited the occasion and the accepted input commands, while not up to Infocom standards, were flexible and usually interpreted correctly. There being a need to interact with many of the other characters, the communication verbs such as BLUFF, CONFESS, ALLY, SNEER and BRIBE are used a great deal.

The use of a sword is also well provided for, with some 20 odd options such as THRUST HIGH, FEINT CUT LOW and PARRY CUT HIGH enabling you to carry out a reasonable simulation of a hectic sword fight.

The aim of the game is to defeat your treacherous brother Eric, who aspires to the vacant crown. There are said to be 40 final endings and over 40,000 different game variations. This perhaps should be taken with a pinch of salt, as I suspect that in those 40 final endings are included some of the different ways you can die when you make a wrong decision.

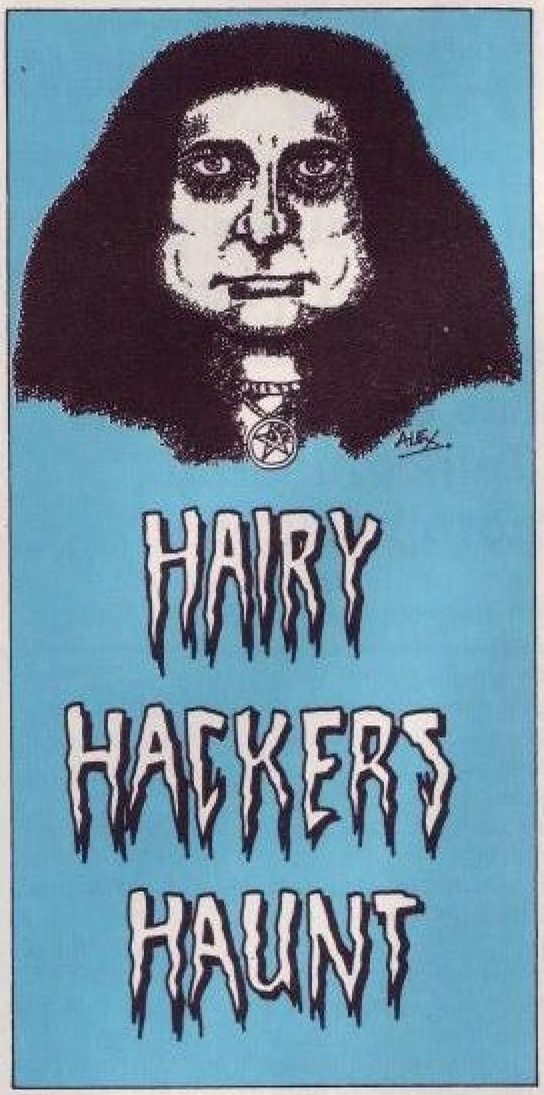
For all that, the game is addictive and interesting and should provide days of plotting and scheming for the throne of Amber.

RATINGS

	Murder on the Atlantic	Passengers on the Wind	Dungeons Amethysts Alchemists	Nine Princes in Amber
Plot	85	80	30	85
Atmosphere	80	75	25	80
Addiction	80	55	33	75
Difficulty	75	40	42	65
Overall	83	70	29	80

ACU







How to hack

This month VAX demonstrates that there's more than one way to hack code!

FRESH from the excitement of emptying the kitchen rubbish bin, digging the garden, feeding the cats, and tidying away all the fragments of the Sunday supplements left by the cats, I thought I'd sit down and read the Hairy Hackers column and then realised I hadn't written it yet. Rats!

Still, there's a nice piccy for me to look at, reflecting me in a quiet, philosophical moment, just after reading my phone bill. Hi to all at Burnt Mill Karate Club, by the way. I'll soon swap that purple belt for a red one folks!

In the mailbag this month we have the usual selection of letters from around the world (well, most of the bits that matter anyway), Justin's disc, a T shirt, and a pair of sweaty socks. Must remember which is the laundry bag ...

Right, furrin' letters first: Brett Hallen of Oz is asking a common question, and this time I'm going to answer it and tell you folks why I haven't answered it previously. Here goes.

The question: How do you know where to peek and where to poke?

The answer: You stare at the code for a while, drink a beer or two, and the answer comes to you while you're getting rid of the beer. Ah, too young to buy beer eh? Well then, first you have to get the code in a form which you can play with.

Usually, this means on a disc. Although it's OK for most of you to put a game on to load, have a bath, toast some crumpets, bath and toast the cat, and then come back to a loaded game, it ain't so for wholesale hackers. We've got to poke around inside the games a few times, and it takes a few goes to get the right bit usually.

Even with the prettiest of speed-loaders, having to load all off tape would get a little, well, boring.

Most fancy loaders are well known by the crowd who know about that sort of thing. If not, it takes a while to track through it all to figure out what it's doing, but you can usually spot what the end of a loading routine looks like, and put in a break there.

This lets the code do the hard work for you, and you have the finished result on a plate, ready to save and lose in the bowels of your disc collection.

Getting this far needs knowledge of something called machine code. If you ain't heard of it, you ain't been reading your *ACU* too closely 'cos we've been running a series or two on it. The reason I haven't said this before is that most people, having got this far, have usually worked the rest out for themselves.

For those who haven't quite cracked it yet, here are some hints: Buy the CPC firmware manual.

Things to look for to show that the loader has done all the hard work are: Jumps going to somewhere way outside the loader program, an instruction of the JP (HL) variety, or the loader loading the code somewhere just after itself. If this is the case, you have to move the loading address so's you can put the breakpoint in the way.

Once you have the whole thing safely stowed away on disc, the next step is to find out where the infinite whatsits and collision detection are in it. This is worked out first, then the method of getting it into the program is figured out. The clever bit you lot don't seem to have worked out is that instead of sneaking in pokes, you could adapt the

routines to write out the code.

Anyway, what were we looking for? Ah yes, infinite things. Well, if the quantity in question is displayed as several digits, then it will probably have arithmetic done on it using SBC or SUB instructions, as these have bits associated with them that make counting in tens a more attractive proposition in computers.

Also, remember that someone is going to have to load it with a value at some point, so it's worth looking for LD A,(number of lives) or (number of lives)+1. Once you have found the secret address, it's fairly easy to search through the code for anything that looks at it or uses it, and changing the one that looks suspicious.

Try to think how you would write the code, and look for magic numbers such as C000 (screen memory), CP A,(number of key), and CD 24 BB (KM–GET–JOYSTICK). Programmers like to put things in subroutines (so I am told....) so find out what each one does by running it, and investigate the ones that look promising.

De-protecting loaders

If the program is dead simple, it will have a basic program loader, followed by several blocks of binary. To do the de-protection of the Basic program, there are many copiers around but, as *ACU* frowns on such things, I can't actually recommend one.

Mind you, Stewart Russell wrote a neat one that hid in the "unused" system ram at BE18, but it was a trifle user-unfriendly. It crashed on the first hint of a mistyped filename. The best utilities are always the ones you have written yourself.

Right, back to blocks of binary. One of the blocks is bound to be a loading screen. Unless this is actually used (Mercenary, Barbarian and others) or checked for (The Key Factor) by the program, it's not worth bothering with most of the time.

Indeed, the legitimate reasons for hacking a program are: To trim off the speed loader so it loads more reliably, and to take off the loading screen so that it loads faster than it would with a "speedloader".

Let the loader take the strain

The next bits of binary on the tape may be saved in a funny way, using odd sync bytes. These are fiddly bits in the tape header that cause most tape copiers to have a fit. Let the program do the work, and put a breakpoint just after the code is loaded.

The last thing you need to know is the length of the code. This can sometimes be deduced from the loader program, the number of 2k blocks it takes up, Utopia, or by using one of those naughty utilities I have not recommended. Save all your code, write a quick loader, and off you go.

Whups! The code overwrites the disc workspace in high memory. No problem. Split the code up, load the last bit in the screen memory and move it down after it is loaded in. As the disc is now finished with, it won't matter if you overwrite the variables, will it?

Some programmers think they're really clever, and have a little machine code routine that encrypts their program so you can't fiddle with it. Usually, the bit that is being decrypted is immediately after this routine.

Simply make a duplicate routine elsewhere in memory, but with a breakpoint after it, and lo; decrypted code. Be careful though, some people write their code so that it doesn't look as if you've decrypted it properly.

There, condensed hacking. Free from artificial preservatives, colouring, and flavouring. Now you know where to poke and peek, you'll send in some of the results won't you?

Stolen property

Right everyone, we have an oddity in our midst. Someone who couldn't hack his way out of a paper bag with a fire axe. I would like to use stronger words, but this is a family show.

Mr. Matthew Pollard of Knutsford in Cheshire, got that everyone? Matthew Pollard has been sending in lots of pokes. Some of these were good and he thought he might win a Poke of the Month award.

Well, dear readers, Matthew has been lifting his pokes from the pages of Amstrad Action. He didn't so much as renumber the programs. His only contribution was to replace the original copyright message with his own name.

Not content with doing this, he also sent in another lot, all lifted from Amstrad Action, expecting another award. Well, Matthew Pollard, you have been rumbled by us and others (thank you S.I. Carter et al) You are hereby stripped of your Hack of the Month award: It's a good job we're sufficiently slow at sending things out that you haven't been sent anything yet. *(Besides our pokes are usually better than AA's – ed).*

As to the original authors of the Xcel poke and others, please accept our apologies.

Aaargh ! Someone's done it again ! Whoever keeps sending blank Activision compliments slips (is it you David?). Please stop it, send some games instead.

More on JSW II pokes. Someone called Norman indecipherable-squiggle has written in with a souped-up version of Paul Russell's poke for the Four Pack version. It lets you walk through BEMs (Bug Eyed Monsters) without complaint and recycles the air for you. Try it:

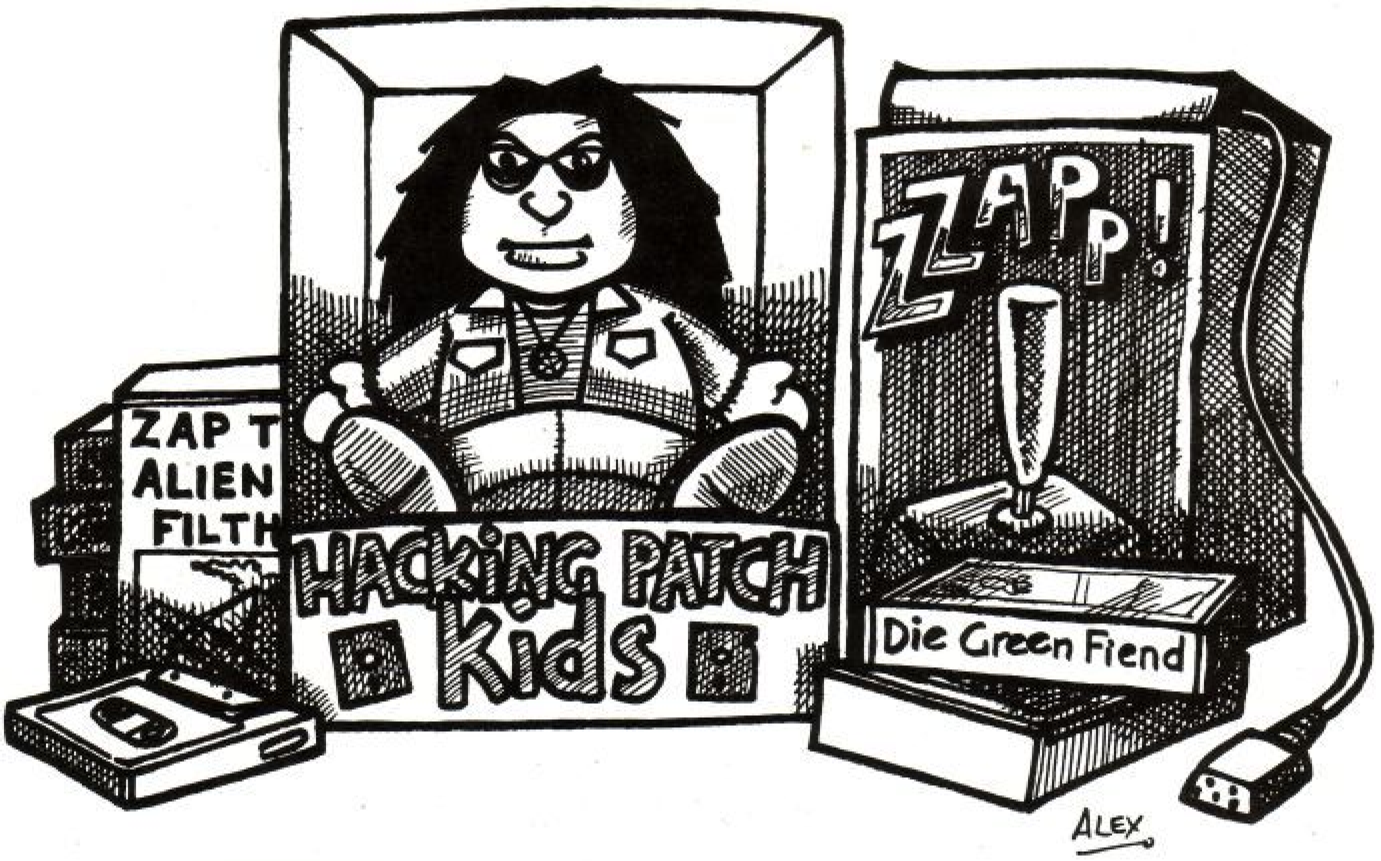
```
10 MEMORY 4999:LOAD "MANIC",&FF0
20 CLS:PRINT "INFINITE LIVES ?"
30 A$=INKEY$:IF A$="" THEN 30
40 IF A$="y" THEN POKE &2DA9,0
50 PRINT "INFINITE AIR ?"
60 A$=INKEY$:IF A$="" THEN 60
70 IF A$="y" THEN POKE &3772,&C9
80 PRINT "IGNORE SPRITES ?"
90 A$=INKEY$:IF A$="" THEN 90
100 IF A$="n" THEN 150
110 POKE &349B,0:POKE &349C,0:POKE
&349D,0
120 POKE &34A6,0:POKE &34A7,0:POKE
&34A8,0
130 POKE &34B1,0:POKE &34B2,0:POKE
&34B3,0
140 POKE &34BC,0:POKE &34BD,0:POKE
&34BE,0
150 CALL &FF0
```

Just run it and put the rewound JSW II tape in any convenient orifice.

A lovely one from Justin is this, Enduro Racer a bit more durable. Could you have a look at my Dad's car Justin? Insert the floppy magnetic bit into the hole in the hard grey bit and run the routine (or just follow the screen instructions ...):

```
10 MODE 1
20 tot=0
30 FOR n=&80 TO &AA
40 READ a$:a=VAL("&"+a$)
50 POKE n,a:tot=tot+a
60 NEXT n
70 IF tot<>2900 THEN PRINT"Oh dear
the errors got a data in it.":END
80 INPUT "Inser t Disc and press
enter. ",a$
90 CALL &80
100 DATA 21,a9,00,cd,d4,bc,79,22
110 DATA 64,00,32,66,00,21,00,01
120 DATA 11,00,00,0e,41,df,64,00
130 DATA 21,a1,00,22,15,02,c3,00
140 DATA 01,3e,18,32,54,65,c3,00
150 DATA 40,84,4a
```

Now it's time to pop down to Justin, and see what goodies he's brought in for us to play with, sorry, investigate, on disc number two. Ah goody, the cassette version of Enduro Racer. This knows about Multiface copiers, ho ho. PASTE[R] :




```
5 ' Hope theres no multiface attached
6 '
10 MODE 1:MEMORY 12345
20 tot=0
30 FOR n=&700 TO &738
40 READ a$:a=VAL("&"+a$)
50 POKE n,a:tot=tot+a
60 NEXT n
70 IF tot<>4820 THEN PRINT"Oh dear I'
ve found an error in the data.":END
80 LOAD "!"
90 CALL &700
100 DATA 2a,97,bb,3a,96,bb,32,1d
110 DATA 07,22,1e,07,3e,c3,21,1a
120 DATA 07,32,96,bb,22,97,bb,c3
130 DATA 05,40,b7,28,03,00,00,00
140 DATA cd,37,bd,3e,c3,21,31,07
150 DATA 32,09,ae,22,0a,ae,c3,e6
160 DATA 41,3e,18,32,54,65,c3,00
170 DATA 40,4a
```

Jackle & Wide time now. No instant death, infinite strength, time and Choccy biccies! Forward past the first file and run the routine. Must invent a PASTE code for that too:

```
10 MODE 1:OPENOUT "d":MEMORY 999
20 INK 0,26:INK 1,0:INK 2,24:INK 3,9
30 LOAD "!",49152
40 LOAD "!",1000
50 LOAD "!",21000
60 POKE 14923,0
70 POKE 20732,0
80 POKE 20083,201
90 POKE 21213,24
100 CALL 1000
```

New speedloader

Before we delve into speedloader territory, you might like to know that there's a new breed of speedloader knocking about. This is a little more tricky to break into, so the hacking program will be a bit bigger.

Now to put the spring in your thing: Infinite oil and lives for Gremlins Thing Bounces Back (tape, by the way. You can tell 'cos the filenames have !s in them). PASTE[R] :

```
10 MODE 1:MEMORY 12345
20 LOAD "!",&4100
30 tot=0
40 FOR n=&80 TO &9B
50 READ a$:a=VAL("&"+a$)
60 POKE n,a:tot=tot+a
70 NEXT n
80 IF tot<>1751 THEN PRINT"Thing says
check the data lines. (s ic)":END
90 CALL &80
100 DATA 21,00,41,11,00,01,01,00
110 DATA 02,ed,b0,21,95,00,22,05
120 DATA 01,c3,00,01,4a,af,32,19
130 DATA 92,c3,00,88
```

Ever get caught up in that Gobots thing? I'm not sure what all the sprites are, but here's infinite lives, scooters and rocks (I think they're rocks) anyway. Either PASTE[R] or fast forward past the first file. Why the empty REM in line 180 Justin?

```
10 MODE 1:OPENOUT "!d":MEMORY &8 3F
20 tot=0
30 FOR n=&A000 TO &A01E
40 READ a$:a=VAL("&"+a$)
50 tot=tot+a:POKE n,a
60 NEXT n
70 IF tot<>2513 THEN PRINT"Huperho
ody! Better check the dat a.":END
80 MODE 0
90 FOR i=0 TO 15:READ c:INK i,c: NEXT
 i
100 BORDER 0
110 LOAD "!gobots.scn",&C000
120 LOAD "!",&840
130 CALL &A000
140 DATA f3,21,40,08,11,40,00,01
150 DATA 00,8c,ed,b0,af,32,50,08
160 DATA 32,ec,0e,32,79,0e,3e,c3
170 DATA 32,54,08,c3,40,00,4a
180
190 DATA 00,13,26,23,02,02,04,26
200 DATA 24,15,06,08,09,11,13,17
```

You'll like this one. Infinite lives for both parts of Imagine's Army Moves. I know it's in two parts, but this poke knows what it's doing, honest. In both cases the tape should be at the beginning of the game, be it either part 1 or 2. The routine is smart in that it knows which version it has loaded and enters the pokes accordingly. Good eh? You try cramming that on the other side of as speedloader!

```
5 ' Try 15372 as the code for part 2.
6 '
10 MODE 1:MEMORY 12345
20 tot=0
30 FOR n=&A000 TO &A05B
40 READ a$:a=VAL("&"+a$)
50 POKE n,a:tot=tot+a
60 NEXT n
70 IF tot<>8714 THEN PRINT"Better che
ck the data I'm afraid." :END
80 LOAD ""
90 CALL &A020
100 DATA 21,40,00,11,41,00,01,00
110 DATA 10,36,00,ed,b0,dd,21,00
120 DATA bf,11,4f,00,cd,4e,bc,21
130 DATA 41,a0,22,4d,bf,c3,00,bf
140 DATA 21,34,a0,3e,c3,32,e2,39
150 DATA 22,e3,39,21,ff,ab,11,40
160 DATA 00,c3,af,39,3e,5b,32,4b
170 DATA 00,3e,99,32,4e,00,f3,f1
180 DATA c9,3a,00,20,fe,bb,28,08
190 DATA 3e,c9,32,89,08,c3,58,93
200 DATA af,32,3b,0b,3e,c3,32,62
210 DATA 0f,c3,90,92
```

That's yer lot 'till next month. Must dash now, it's cat feeding time and the cats seem to be substituting some vile fluff they've found on the carpet for Wiskas at the moment.

Hang on, that's my hair they're eating! Heyyyyyaaahhhhh...
Luv VAX & Wife

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BIG AND BOUNCY

Any Swing Out Sister fans among our readership? If so, you'll be glad to hear that this month's machine code morsel from Peter Green is a version of that old favourite/chestnut (delete as applicable) Breakout.

This month we gain an insight into one of the Editor's little peccadillos. Yes, Simon is a coin-op fanatic. And a few days ago he said "Why not do a Breakout game in your article this month?".

Suppressing my natural answer "Because I hate it" – well, he does authorise my payments – I made enthusiastic noises and developed the basic game in Listing I. This is a no-frills version which shows some of the techniques used in arcade-type programs.

Breakout, for those who have dwelt in the upper reaches of the Amazon for the last 10 years, is a game where a ball continually bounces off the top and sides of the screen.

The player controls a small bat which can move from side to side, and each time he fails to prevent the ball from hitting the bottom of the screen he loses a life. Near the top of the screen are several rows of bricks: Each time the ball hits one it bounces, but the brick is destroyed. The object of the game is to remove all the bricks.

The game plan

The overall structure of the game is thus quite simple. First we need to set up the screen with all the bricks in place, scores initialised, and the bat and ball in their starting positions. The main game loop then continually cycles through the following sequence:

1 Wait for frame flyback so that the screen update is invisible.
2 Erase the bat and ball at their old screen position.
3 Check the joystick to see if the player wants to move the bat.
4 Calculate the new position for the bat.
5 Calculate the new position for the ball. Check if this is off the screen, or is occupied by the bat or a brick.
6 If such a collision has occurred, invert the sign of the ball's velocity so that it travels back in the opposite direction (bounces, as we professionals say), and leave the ball at its old position.
7 If the collision was with a brick, erase the brick from the screen and score some points.
8 Draw the bat and ball in their new positions.
9 Loop back to 1.

The loop is exited only if all the bricks are gone, in which case the player has completed the level and can go to the next, or if the player misses the ball, thus losing a life. When all the lives are lost, the score is reset to zero for a new game.

This sequence of erase sprites/move sprites/process collisions/draw sprites is the basis for all arcade games, from Pong and Space Invaders to the latest stuff arriving on the shelves.

What makes a best-selling game, of course, is the skill with which a programmer can hang new types of flesh on this basic skeleton. Pass the assembler, Igor . . .

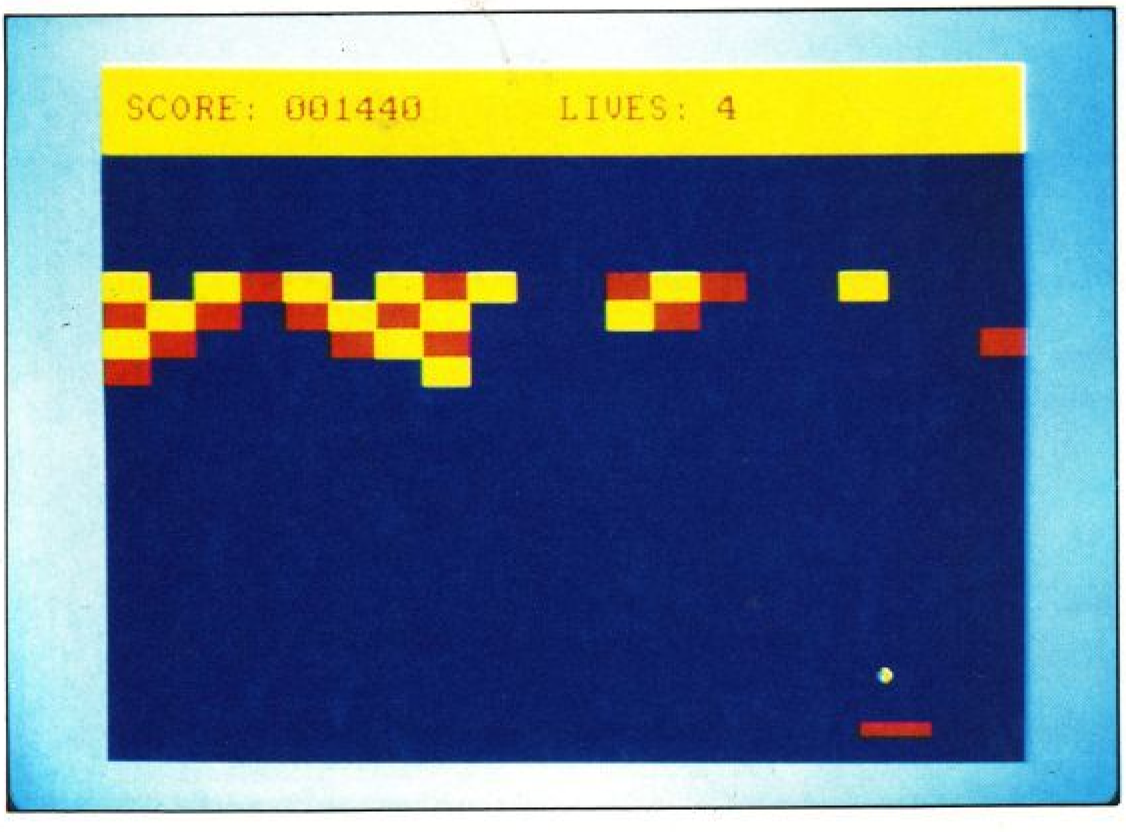
Initial impressions

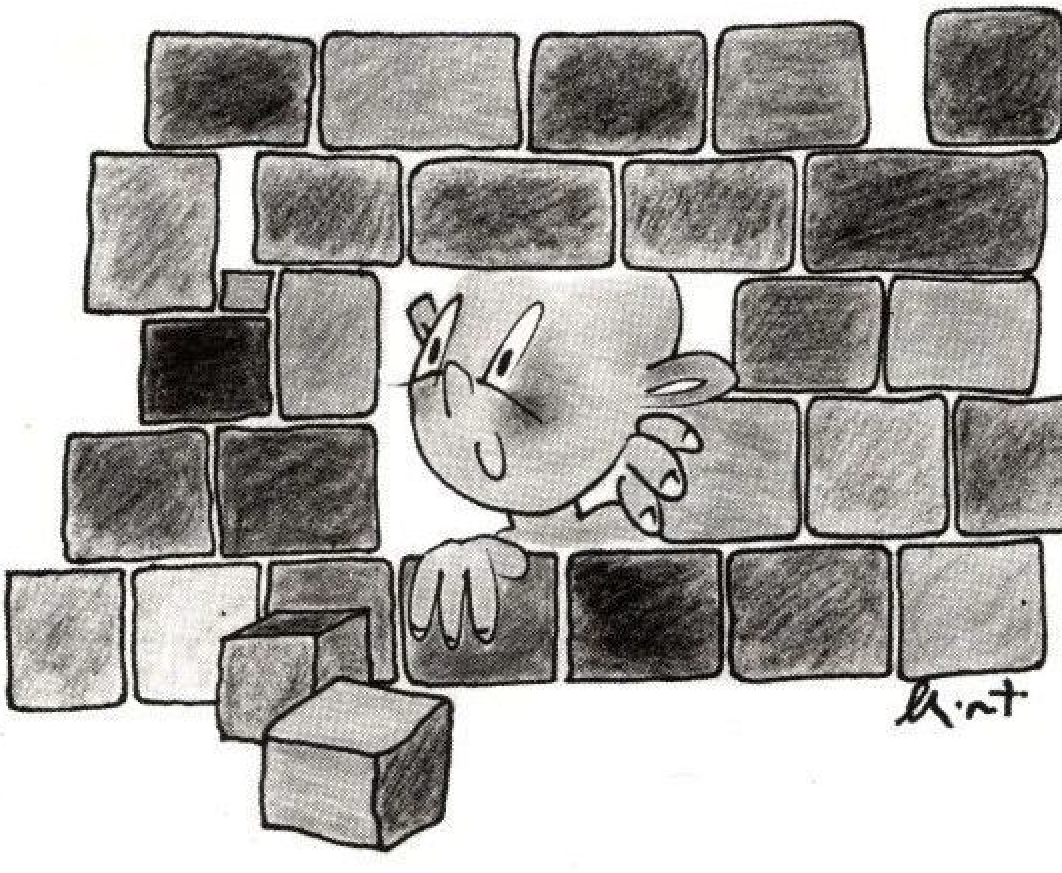
Right, let's take a look at these various program elements as they appear in Listing I. First comes the initialisation of the game variables, screen set-up and so on. This is the section from the start of the program as far as the label .frame_loop, and it has three different entry points.

First, entry at .init will initialise everything: The score is zeroed, lives set to 9 and so on. This is necessary when playing the game for the first time, or after losing all the lives. The starting values are copied into the variables using the block move LDIR as described in last month's article.

If the player successfully clears a level, the program loops back to .level_loop: Here, everything is initialised except the score and lives remaining, which are carried over. We need the screen to be set up, and first it's set to Mode 1.

Next, the five rows of 20 bricks (each two characters wide) are drawn on screen by printing a sequence of





coloured spaces. As the comments on the listing explain, the bricks are printed alternately in two colours to give a checkerboard effect.

This section also sets up the score window at the top of the screen, clears it, prints the headings "Score:" and "Lives:" and displays the current values.

The final entry point to the initialisation block is used when a player has lost a life but still has some left. We need to keep the displayed bricks the same, gaps and all, but reset the bat and ball to their starting positions. We also need to "prime" the screen by drawing the bat and ball at their start locations.

This is necessary because the sprite is displayed using the XOR technique (which I explained many clock cycles ago in a series called "Roland Takes A Running Jump").

We combine the sprite graphic with the screen contents by XORing them together: Due to the way XOR works, we can erase the sprite by doing the same thing a second time. This is because XORing something with the same number twice leaves it unchanged.

However, since the sprites are erased first in the animation loop, we have to put them on the screen before we enter the loop so that they're there to erase.

The main animation loop begins at the label .frame_loop by waiting for next frame flyback. This is partly so that the sprites are erased and redrawn while the TV electron beam is moving back up to the top left of the screen, so the change is flicker-free.

It also provides the time base of 50 frames a second that controls the speed at which the sprites move. When frame flyback occurs, the bat and ball are erased.

Next the joystick is scanned using the Amstrad firmware routine, which returns the status in A as shown in Table I. We're only interested in whether the bat is moving left or right, decided by throwing away all except those two bits. If neither left or right is set, the parity of A will be even, so the JP PE (JumP on Parity Even) skips the bat move code.

Otherwise the parity of A will be odd as A will have only a single bit set. In this case, the position of the bat (stored simply as the screen address of its top left corner) is increased or decreased by 1, provided this will not take the bat off either screen edge. As there are four pixels per screen byte in Mode 1, the bat moves at a speed of four pixels per frame.

The bat has no vertical movement, but the ball has both x and y velocities: We have to move and check for collisions in each of these directions separately. First the x coordinate and x velocity are added together to obtain the new position. If this takes it over a screen edge, the ball bounces.

One way of checking whether the ball has hit a brick would be to look at the screen ram and see if anything is there. However, this program uses a bitmap – a section of memory where each bit represents one possible brick position on the screen.

Bit 0	UP
Bit 1	DOWN
Bit 2	LEFT
Bit 3	RIGHT
Bit 4	FIRE 2 (NOT USED)
Bit 5	FIRE 1 (NOT USED)
Bit 6	N/A
Bit 7	N/A

Table I: Joystick status bits

If a bit is clear, the screen space is empty: If set, there's a brick there. The brick can then be erased from the screen and also removed from the bitmap by resetting the required bit. Bitmaps are very useful tools in programming for storing this type of either/or information in compact form.

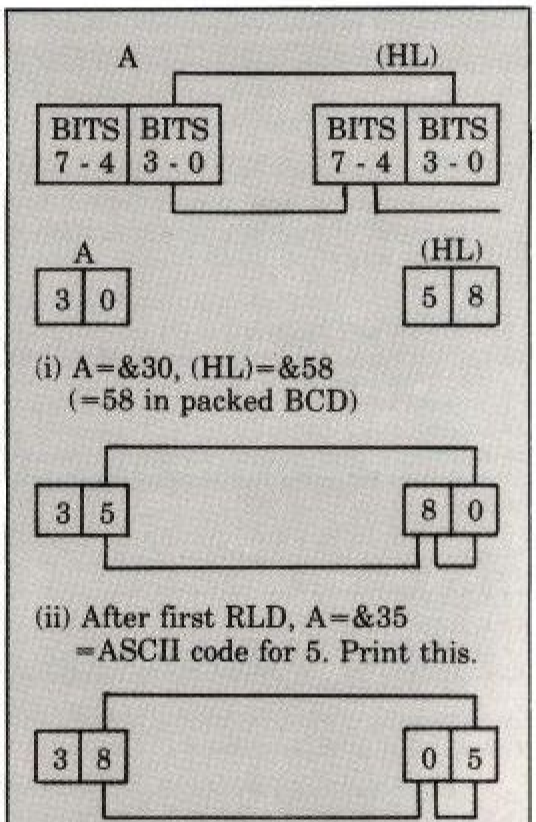
For example, your Amstrad disc drive keeps track of which sectors of a disc are used and which are free by means of a bitmap.

A similar section of program then checks for collisions in the y direction. However, there is an extra section to check if the ball is hitting the bat. For variety, this is done by calculating the screen address of the top left corner of the ball and seeing if it lies inside the range of addresses for the top of the bat. If it does, they've hit each other.

The bounce mechanism simply negates the velocity in the direction caused the collision, and throws away the new coordinate. In addition, bouncing off a brick causes a 20 point score increment to be stored in the points variable.

The program makes allowance for the fact that the ball could simultaneously hit two bricks, one in each direction, thus causing a double score to be registered.

Next, the bat and ball are redrawn in



(i) A=&30, (HL)=&58 (=58 in packed BCD)

(ii) After first RLD, A=&35 =ASCII code for 5. Print this.

(iii) After second RLD, A=&38 =ASCII code for 8. Print this.

(iv) After third RLD, A and (HL) are where they started.

Figure I

their new positions. One complication is involved in the ball sprite, which moves two pixels per frame in the x direction. Unfortunately, there are four pixels per screen byte in Mode 1, so for the ball to appear to move a smaller distance, we need two sprite graphics, ball_pic1 and ball_pic2.

Each is two bytes wide, but the first has the ball hard against the left edge of the rectangle, the second has the data moved two bits to the right.

Let me out of here

Next the program checks whether the Escape key has been pressed, and quits if it has. Otherwise the points variable is checked: Normally zero, if contains a number then the player's score has to be updated by that amount. The points are added to the score using BCD arithmetic (I explained why last month), and the new score is printed.

The routine print_score introduces a new Z80 instruction, RLD. This is best explained by reference to Figure I: It swaps around the two nibbles of the byte pointed to by HL, and the low nibble of the A register.

Since the high nibble of A doesn't change, we can put the Ascii prefix for a number, &30 in it. The first RLD moves the first packed BCD digit into the low nibble of A, so A is now the Ascii code for that digit, which is printed.

The second RLD moves the nibbles around again, fetching the second BCD digit for printing, and the final RLD restores the numbers to the way they started. HL can then be pointed to the next pair of packed BCD digits, and so on.

After printing the score, points is restored to zero ready for the next frame loop. Finally, a score update means a brick has disappeared, so the brick count is checked. The level is finished when all 100 bricks have gone.

If the ball misses the bat, the death routine does a short flash of the border colours and updates the lives count and display. The subsequent initialisation depends on whether all the lives have been lost, as described above.

Bells and whistles

This is only a basic version of Breakout. If you like, try adding other features to it – sound effects when the ball bounces or a brick is destroyed, extra lives when a certain number of points are scored and so on. As an example, look at Arkanoid, the latest Breakout-type game. This has a whole load of snazzy features to jazz up the genre.

Listing I

```
1 nolist

.KM_READ_CHAR        EQU &BB09
.KM_GET_JOYSTICK     EQU &BB24
.TXT_OUTPUT          EQU &BB5A
.TXT_WIN_ENABLE      EQU &BB66
.TXT_SET_CURSOR      EQU &BB75
.TXT_SET_PEN         EQU &BB90
.TXT_SET_PAPER       EQU &BB96
.SCR_RESET           EQU &BC02
.SCR_SET_MODE        EQU &BC0E
.SCR_SET_INK         EQU &BC32
.SCR_SET_BORDER      EQU &BC38
.SCR_CHAR_POSITION EQU &BC1A
.MC_WAIT_FLYBACK     EQU &BD19

.bat_size            EQU &0406 ;4 rows high, 6 bytes wide
.ball_size           EQU &0402 ;4 rows high, 2 bytes wide
.brick_size          EQU &0804 ;8 rows high, 4 bytes wide

org &8000

.init
CALL SCR_RESET       ;Set default coloursLD BC,&1414
CALL SCR_SET_BORDER ;Set border cyan
LD HL,start
LD DE,y_ball
LD BC,start-y_ball  ;Initialize all variables
LDIR                ;Copy starting values into the variables

.level_loop
LD HL,start
LD DE,y_ball
LD BC,score-y_ball  ;Initialize 'new level' variables
LDIR

LD A,1
CALL SCR_SET_MODE   ;Set screen to Mode 1
LD HL,&0107
CALL TXT_SET_CURSOR ;Move text cursor to column 1 row 7
LD DE,&0301          ;ink 3/ink 1
LD BC,&0A05          ;Width counter 10/row counter 5

.brick_loop
PUSH BC              ;Save counters

.bl1
LD A,D
CALL TXT_SET_PAPER  ;Set paper to ink in D
LD A,32
CALL TXT_OUTPUT
CALL TXT_OUTPUT      ;Print 2 spaces to represent a brick
LD A,E
CALL TXT_SET_PAPER  ;Set paper to ink in E
LD A,32
CALL TXT_OUTPUT
CALL TXT_OUTPUT      ;Print the next brick in the other colour
POP BC               ;Restore counter
DJNZ bl1             ;Loop 10 times, printing 20 bricks

LD A,E
LD E,D
LD D,A               ;Now swap over the inks in D and E
POP BC               ;Get counters
DEC C                ;Decrement row counter
JR NZ,brick_loop     :Loop 5 times, printing rows in alternating colours

LD HL,&0000
LD DE,&2702
CALL TXT_WIN_ENABLE ;Set up score window
LD A,3
CALL TXT_SET_PEN    ;Select red letters
LD A,1
CALL TXT_SET_PAPER  ;on a yellow background
LD HL,screen
CALL print           ;Print the score headings
CALL print_score     ;Print the current score
LD HL,&1C02
CALL TXT_SET_CURSOR ;Move cursor to 'lives' position
LD A,(lives)         ;This is a number 0-9
ADD A,&30            ;Convert it to ASCII (see last mbnth)
CALL txt_output      ;Print it

.game_loop
LD HL,start
LD DE,y_ball
LD BC,bitmap-y_ball
LDIR                  ;Initialize 'new game' variables

LD BC,bat_size        ;Get height and width of bat
LD DE,(bat_addr)      ;Get screen address for bat
LD HL,bat_pic
CALL draw_block       ;Draw the bat
LD BC,ball_size       ;Height and width of ball
LD DE,(ball_addr)     ;Get screen address for ball
LD HL,ball_pic1
LD (ball_pic),HL
CALL draw_block       ;Draw the ball
.frame_loop
CALL MC_WAIT_FLYBACK ;Wait for frame flyback so screen update is invisible

LD BC,bat_size        ;Get height and width of bat
LD DE,(bat_addr)      ;Get screen address for bat
LD HL,bat_pic
CALL draw_block       ;Erase the bat
LD BC,ball_size       ;Height and width of ball
LD DE,(ball_addr)     ;Get screen address for ball
LD HL,(ball_pic)
CALL draw_block       ;Erase the ball


CALL KM_GET_JOYSTICK ;Read the joystick, returning status in A
LD DE,(bat_addr)      ;Get the bat address again
AND &0C               ;Keep only the left/right bits
JP PE,no_move         ;If neither left or right pressed, bat stays still

AND 8                 ;Else see if right bit is set
JR NZ,move_R          ;If it is, try to move right

LD HL,&E730           ;Else try to move the bat left. Get left limit
SBC HL,DE             ;Do 16-bit compare
JR Z,no_move          ;If already at far left, can move no further
DEC DE                ;Else move left one screen byte (four pixels)
JR no_move            ;and skip the move-right routine

.move_R
LD HL,&E77A           ;Get right limit
SBC HL,DE             ;Do 16-bit compare
```

```
JR Z,no_move            ;If already at far right, can move no further
INC DE                  ;Else move right one screen byte(four pixels)

.no_move
LD (bat_addr),DE        ;Store new bat address

LD DE,(x_ball)          ;Get ball x coord
LD A,(x_vel)            ;Get ball x velocity
LD L,A                  ;Move it to L
RLA                     ;Move top bit of A into carry flag
SBC A,A                 ;A = Ø if A was positive, else A = &FF
LD H,A                  ;So now HL is the 16-bit signed velocity
ADD HL,DE               ;Add velocity to old x coord to get new x coord
EX DE,HL                ;Save it in DE
LD HL,317               ;Right hand edge
OR A                    ;Clear the carry flag
SBC HL,DE               ;Do 16-bit compare
JR C,bounce_x           ;If x > 317 , ball must bounce in the x direction ('cos
                        ;either x = 318 (right) orx = -2 = 65532 (left))

LD A,(y_ball)           ;Not hit screen edge, but has ball hit a brick?
CALL hit_bit            ;Use old y, new x to index bitmap, see if hit brick
JR Z,no_bounce_x        ;If not, new x coord is OK

XOR (HL)                ;Else remove the bit corresponding to the brick that
LD (HL),A               ;the ball has hit
SRL D
RR E
SRL E
SRL E                   ;Divide DE by 8 to convert pixel coord to physical
RES Ø,E                 ;But make column even 'cos bricks are 2 chars wide
LD H,E                  ;Move character column to H
LD A,(y_ball)           ;get ball y coord (Ø-168)
SRL A
SRL A
SRL A                   ;Divide A by 8 to convert pixel coord to physical coord
ADD A,3                 ;Add three rows for score window at top
LD L,A                  ;Move character row to L
CALL SCR_CHAR_POSITION ;Calculate screen address
LD BC,brick_size        ;Brick height and width
CALL clear_block        ;Erase the brick
LD A,&2Ø
LD (points),A           ;Score 2Ø points (BCD number)
.bounce_x
LD A,(x_vel)            ;Get the x velocity
NEG                     ;Negate it (which flips the direction)
LD (x_vel),A            ;Put back new x velocity
LD DE,(x_ball)          ;Put old x in DE

.no_bounce_x
LD (x_ball),DE          ;Store new x coord

LD A,(y_vel)            ;Get ball y velocity
LD HL,y_ball            ;Point to ball
's y coord
ADD A,(HL)              ;Add to velocity to get new y coord CP 172
                        ;Reached bottom of screen?
JP Z,death              ;If yes, missed bat so player loses a life

JR NC,bounce_y          ;If coord now 'greater' than 172, must be negative
                        ;('cos -2 = &FE =254), so bounce off top edge

PUSH AF                 ;Save new y
CALL hit_bit            ;Use new y, new x to index bitmap
JR Z,hit_bat            ;If no brick, see if hit bat

XOR (HL)                ;Else remove the bit corresponding to the brick that
LD (HL),A               ;the ball has hit
SRL D
RR E
SRL E
SRL E                   ;Divide DE by 8 to convert pixel coord to physical
                        ;coord
RES Ø,E                 ;But make column even 'cos bricks are 2 chars wide
LD H,E                  ;Move character column coord
RES Ø,E                 ;But make column even 'cos bricks are 2 chars wide
LD H,E                  ;Move character column coord
RES Ø,E                 ;But make column even 'cos bricks are 2 chars wide
LD H,E                  ;Move character column to  H
POP AF                  ;Get ball y coord (Ø-168)
SRL A
SRL A
SRL A                   ;Divide A by 8 to convert pixel coord to physical coord
ADD A,3                 ;Add three rows for score window at top
```

```
LD L,A                  ;Move character row to L
CALL SCR_CHAR_POSITION ;Calculate screen address
LD BC,brick_size        ;Brick height and width
CALL clear_block        ;Erase the brick
LD A,(points)           ;Get possible score generated by an x collision
ADD A,&20               ;Add another 20 points for this y collision
LD (points),A           ;Store total scored this time
JR bounce_y             ;Skip next bit (if hit brick, can't have hit bat)

.hit_bat
POP AF
PUSH AF                 ;Get new y coord and return it to stack
CALL scradd             ;Calculate screen address of ball
LD D,H
LD E,L                  ;Copy address to DELD BC,(bat_addr)
OR A
SBC HL,BC               ;(ball_addr) - (bat_addr)
JR C,no_bounce_y        ;New y coord is OK
LD HL,5
ADD HL,BC               ;HL = bat_addr+5

SBC HL,DE               ;(bat_addr+5) - (ball_addr)
JR C,no_bounce_y        ;New y coord is OK
POP AF                  ;Else hit bat, so drop new y coord

.bounce_y
LD A,(y_vel)            ;Get the y velocity
NEG                     ;Negate it (which flips the direction)
LD (y_vel),A            ;Put back new y velocity
LD A,(y_ball)           ;Put old y in A
PUSH AF                 ;and on to the stack

.no_bounce_y
POP AF                  ;Get y coord from stack
LD (y_ball),A           ;Store new y coord

CALL scradd             ;Calculate screen address of ball
LD (ball_addr),HL       ;Store it
EX DE,HL                ;Move it to DE

LD BC,ball_size         ;Get ball size
LD HL,ball_pic1         ;First assume using ball picture 1
LD A,(x_ball)           ;Get low byte of ball x coord
AND 2                   ;Check if bit 1 is set or reset
JR Z,ds1                ;If reset, ball picture 1 is what we want
LD HL,ball_pic2         ;Else use other pic with ball shifted by 2 pixels
.ds1
LD (ball_pic),HL        ;Store the ball picture address
CALL draw_block         ;Draw the ball in its new position

LD HL,bat_pic           ;Get address of bat graphic
LD DE,(bat_addr)        ;Get screen address of bat
LD BC,bat_size          ;Get bat size
CALL draw_block         ;Draw the bat in
 its new position

CALL KM_READ_CHAR       ;Any in key buffer?
JR NC,no_quit           ;Skip if not
CP &FC                  ;Else is it ESC?
JR NZ,no_quit           ;Skip if not
XOR A
CALL TXT_SET_PAPER      ;Else set paper 0
LD A,1
CALL TXT_SET_PEN        ;and pen 1
LD A,2
JP SCR_SET_MODE         ;and quit

.no_quit
LD A,(points)           ;If got here, game still running. Get points
OR A                    ;If zero, nothing was scored this pass through loop
JP Z,frame_loop         ;So loop back for next pass

LD HL,score+2           ;Else need to update score. Point to LSB of score

ADD A,(HL)              ;Add points to low byte of score (fifth and sixth digits)
DAA                     ;Remember from last month,scores use BCD arithmetic
LD (HL),A               ;Store result
LD A,0
DEC HL
ADC A,(HL)
DAA
LD (HL),A               ;Add possible carry into third and fourth digits
LD A,0
DEC HL
ADC A,(HL)
DAA
LD (HL),A               ;Add possible carry into first and second digits

CALL print_score        ;Print the new score
XOR A
LD (points),A           ;Set points to zero again

LD A,(brick_count)      ;If scored, must have removed a brick from screen
DEC A                   ;So decrement the number of bricks
LD (brick_count),A      ;Store new count
JP NZ,frame_loop        ;If not zero, still bricks remaining so loopback
JP level_loop           ;Else cleared this level, so goto nextlevel

.death
LD B,10                 ;Come here when lost a life. Set up loop counter

.d1
PUSH BC                 ;Save counter
CALL MC_WAIT_FLYBACK ;Wait for frame flyback
                        ;(easy way of doing 1/50th sec wait)
LD BC,&0606
CALL SCR_SET_BORDER     ;Turn the border red
CALL MC_WAIT_FLYBACK ;Wait another 1/50th second
LD BC,&1414
CALL SCR_SET_BORDER     ;TurCALL SCR_SET_BORDER
                        ;Turnn the border cyan again (ie, flash the border)
POP BC                  ;Get counter
DJNZ d1                 ;Repeat 10 times

LD HL,&1C02
CALL TXT_SET_CURSOR     ;Move cursor to lives position in score window
LD A,(lives)            ;Get number of lives
DEC A                   ;Decrement it
LD (lives),A            ;Put it back
JP Z,init               ;New game if no lives left
ADD A,&30               ;Else convert number (0-9) to ASCII
CALL TXT_OUTPUT         ;Print it
JP game_loop            ;Loop back to start current level again

.print_score
LD HL,&0902
CALL TXT_SET_CURSOR     ;Move cursor to score area in score window
LD HL,score             ;Point to score (stored as packed BCD, see last month)
LD B,3                  ;Three BCD bytes to print for a 6-digit score
LD A,&30                ;Put a 3 in the high nibble of A
.ps1
RLD                     ;Rotate the nibbles as described in text
CALL TXT_OUTPUT         ;Print ASCII code in A register
RLD                     ;Rotate the nibbles a second time
CALL TXT_OUTPUT         ;Print this ASCII code too
RLD                     ;A third rotation leaves A and (HL) the way they started
INC HL                  ;Point to next BCD byte
DJNZ ps1                ;Loop three times
RET                     ;and exit

.hit_bit
;---------------------------------------------
; Enter with A = y coord, DE = x coord
; Exit with HL = address of byte in brick bitmap
;           A = 0 or mask for bit in byte
;           Z if no brick, NZ if brick
;---------------------------------------------

LD HL,bitmap-3 ;Point to start of bit map less three bytes
LD BC,3         ;Number of bytes in a  row
SRL A
SRL A
SRL A           ;Divide y by 8 'cos bricks are 8 pixels high
INC A


.hb1
ADD HL,BC       ;Add 3 bytes per row
DEC A
JR NZ,hb1

LD B,D
LD C,E          ;Copy x coord to BC
LD A,E          ;Copy x low byte to A

SLA C
RL B            ;Multiply BC by 2
LD C,B
LD B,0          ;and divide by 256, overall effect is to divide BC by 128
                ;Now HL = address of required byte within bitmap table

LD BC,p2        ;point BC to "powers of 2" table
SRL A
SRL A
SRL A
SRL A
AND 7           ;A = (x coord/4) MOD 8

ADD A,C
LD C,A          ;Add A to BC (adding 8 bits to 16 bits, so need to take into
JR NC,hb2       ;account a possible carry from C to B)
INC B

.hb2
LD A,(BC)       ;Pick up table entry so A contains one bit set corresponding to
                ;single brick within bitmap byte
AND (HL)        ;Is there a brick there?
RET

.p2
BYTE &80,&40,&20,&10,8,4,2,1
```

```
.scradd
;--------------------------------------------------------
; Enter with  A = y coord of ball
; Exit with  HL = screen address, AF, BC and DE corrupt
;--------------------------------------------------------

LD E,A              ;Save y in E
AND 7               ;A = y MOD 8 = line in char row
INC A
LD HL,&C0F0         ;Screen address corresponding to top left of play area
LD BC,2048          ;Screen block offset

.scradd1
DEC A
JR Z,scradd2
ADD HL,BC           ;Add 2048*A to HL
JR scradd1

.scradd2
LD A,E              ;Fetch y coord again
SRL A
SRL A
SRL A               ;Divide by 8 to get row number
LD BC,80
INC A

.scradd3
DEC A
JR Z,scradd4
ADD HL,BC           ;Add 80*A to HL
JR scradd3

.scradd4
LD BC,(x_ball)      ;Get ball x_coord
SRL B
RR C
SRL C               ;BC = x coord DIV (pixels/byte) which is 4 for Mode 1
ADD HL,BC           ;Now HL = screen address for top left of ball RET



.clear_block
;--------------------------------------------------------
; Enter with HL = screen address of top left of rectangle
;             B = height of rectangle in pixel rows
;             C = width of rectangle in screen bytes
;--------------------------------------------------------

PUSH BC
PUSH HL

.cb1
LD (HL),0           ;Store zero in screen memory
INC HL
DEC C
JR NZ,cb1           ;Loop until one line cleared

POP HL              ;Get line start
LD BC,2048          ;Offset to next byte down in screen memory
ADD HL,BC           ;Add the offset
JR NC,cb2           ;If result not greater than &FFFF, it's valid

LD BC,&C050         ;Else jumped out of screen RAM, so need extra correction
ADD HL,BC           ;factor to get the correct screen address

.cb2
POP BC              ;Now restore height counter (and reset C for next line)
DJNZ clear_block    ;Loop until all rows done
RET                 ;Then exit
.draw_block
;--------------------------------------------------------
; Enter with HL = address of graphic data
;            DE = screen address of top left of rectangle
;             B = height of rectangle in pixel rows
;             C = width of rectangle in screen bytes
;--------------------------------------------------------

PUSH BC
PUSH DE

.db0
LD A,(DE)           ;Get byte from screen memory
XOR (HL)            ;XOR it with the graphic byte
LD (DE),A           ;Put the combined byte back into the screen
INC HL
INC DE              ;Increment both pointers
DEC C               ;Loop width times
JR NZ,db0

POP DE              ;Get line start
EX DE,HL            ;Move to HL
LD BC,2048          ;Offset to next byte down in screen memory
ADD HL,BC           ;Add the offset
JR NC,db1           ;If result not greater than &FFFF, it's valid

LD BC,&C050         ;Else jumped out of screen RAM, so need extra correction
ADD HL,BC           ;factor to get the correct screen address

.db1
EX DE,HL            ;Swap pointers back to correct registers
POP BC              ;Now restore height counter (and reset C for
next line)
DJNZ draw_block     ;Loop until all rows done
RET                 ;Then exit

.print
LD A,(HL)           ;'Dat ole black magic still has me in its spell... INC HL
OR A
RET Z
CALL TXT_OUTPUT
JR print


;----------------------
; Actual game variables
;----------------------

.y_ball       BYTE 0
.x_ball       WORD 0
.y_vel        BYTE 0
.x_vel        BYTE 0
.ball_pic     WORD 0
.ball_addr    WORD 0
.bat_addr     WORD 0
.points       BYTE 0

.bitmap       RMEM 66
.brick_count BYTE 0

.score        RMEM 3
.livesr   WORD 0
.bat_addr     WORD 0
.points       BYTE 0

.bitmap       RMEM 66
.brick_count BYTE 0

.score        RMEM 3
.lives        BYTE 0


;--------------------------------------------------------
Values to which the above variables should be initialized
;--------------------------------------------------------
.start
BYTE 160          ;y_ball
WORD 160          ;x_ball
BYTE -2           ;y_vel
BYTE 2            ;x_vel
WORD ball_pic1    ;old ball pic for erasure
WORD &C758        ;ball_addr
WORD &E755        ;bat_addr
BYTE 0            ;points

RMEM 9            ;bitmap starts with
3 empty rows
BYTE &FF,&FF,&FF ;5 full rows
BYTE &FF,&FF,&FF
BYTE &FF,&FF,&FF
BYTE &FF,&FF,&FF
BYTE &FF,&FF,&FF
RMEM 42

BYTE 100          ;brick count

RMEM 3            ;score
BYTE 9            ;lives


.bat_pic
BYTE &FF,&FF,&FF,&FF  ;Just a slab of ink 3
BYTE &FF,&FF,&FF,&FF
BYTE &FF,&FF,&FF,&FF
BYTE &FF,&FF,&FF,&FF
BYTE &FF,&FF,&FF,&FF
BYTE &FF,&FF,&FF,&FF

.ball_pic1
BYTE &60,&00,&F0,&00,&F0,&00,&60,&00


.ball_pic2
BYTE &10,&80,&03,&C0,&03,&C0,&10,&80

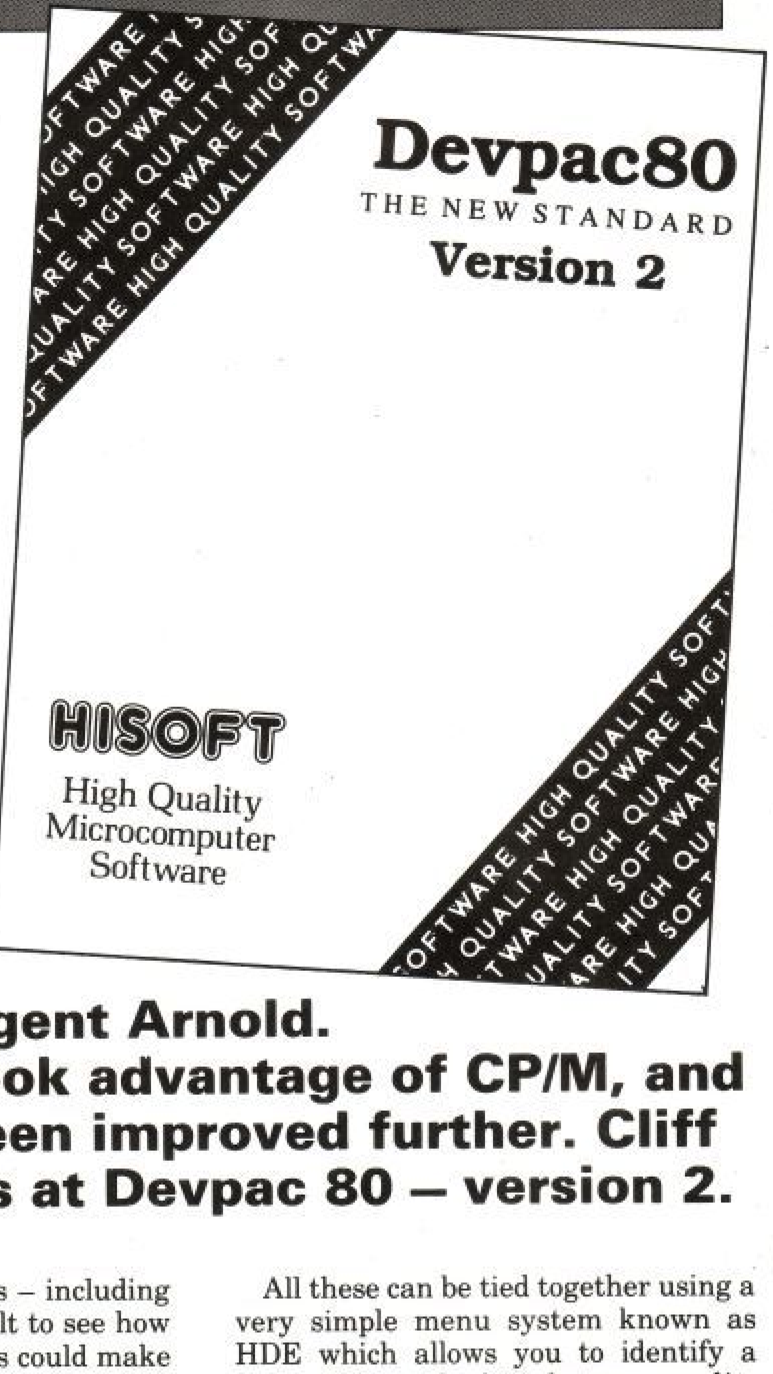

.screen
TEXT 12,31,2,2,'SCORE:            LIVES: ',0

list
end
```

ACU

Code cracker

Devpac was the first full blooded assembler for the emergent Arnold. Devpac 80 took advantage of CP/M, and now it has been improved further. Cliff Lawson looks at Devpac 80 – version 2.



A couple of months ago Pete Green looked at the new assembler program development system from Arnor – Maxam II. His general conclusion was enthusiastic, but it has to be said that £80 is a lot of money even for the most dedicated hobbyist.

I found the package lacked a couple of essential features for "large" program development: For small utilities it is extremely good, but lacking the ability to generate relocatable object modules is a serious drawback.

No fixed a-code

As the production of relocatable modules is one of the major new features of Devpac 2, perhaps a few words on their significance would not come amiss. For the uninitiated, it is unusual for programmers to write reasonably large programs as just one huge source file. Instead, such programs are usually written in smaller modules. There are two ways to go about this.

The first is to tie all the separate sections together at assembly time using an assembler command such as INCLUDE. One main assembler file would contain just a few assembler statements such as . . .

```
INCLUDE INITCODE.ASM
INCLUDE MAIN LOOP.ASM
INCLUDE MOVEBASE.ASM
INCLUDE ZAPTHEBA.ASM
INCLUDE EXPLOSON.ASM
```

When you assemble this main file, each module is assembled in turn and the code it generates is added to build one big file. This technique is all very well if each module can be assembled and tested separately. But if each relies on functions in another module, you would have to assemble all the files each time one was changed. You would probably get to the point of tearing your hair out long before the point at which it was taking even 15 minutes for each assembly.

The missing link

The second, far neater, solution is to get the assembler to generate relocatable object modules (known in the trade as .REL files). As changes are made to a single module, it alone needing be reassembled. The resulting .REL module can then be combined with the other modules, prepared earlier in true Blue Peter fashion.

This requires a tool known as a linkage editor. All Amstrad CP/M Plus machines are provided with a suitable tool, LINK.COM which is actually designed to be used with the free 8080 assembler. Almost all other "serious" assemblers and language compilers have .REL files as their output so it is easy to combine assembler subroutines with higher level languages.

While the new Devpac is designed to run on all CP/M machines – including the CPC 464 – it is difficult to see how anyone without CP/M Plus could make use of the relocatable nature of the assembler when they are missing LINK.

Devpac 2 from HiSoft consists of three major parts:

- An editor with which you can construct Z80 assembler source files.
- An assembler that takes such a source file and either generates a directly executable CP/M program (a COM file) or produces linkable object modules (which are subsequently LINKed to produce .COM files)
- A "front panel" debugger that lets you see what is happening to the processor / memory as your newly produced program is run.

In fact there are two versions: A totally new version, ProMON, as well as the older MON80. The older version is present for people who might be familiar with it and also because its smaller size might be important when debugging a very large program.

All these can be tied together using a very simple menu system known as HDE which allows you to identify a main file and skip between edit, assemble and debug. I found it easy to work in the way I'm used to, operating editor, assembler and debugger separately.

Added goodies

The supplied disc contains a simple-to-use file copying program, an equally simple file deletion utility and extended directory command. There are also utilities to convert CP/M .COM files to AMSDOS .BIN files by adding a header or AMSDOS to CP/M by removing the header and a program to take assembler source files from GENA31 (the old AMSDOS version of Devpac) converting them to a suitable form for use with the new assembler. There are source files for the major examples given in the manual.

Using the various conversion utilities means that the CP/M based package can be used to develop AMSDOS pro-

grams, though you will lose the opportunity to use the debugging utilities.

The Editor

ED80 is the same editor as supplied with the previous version of Devpac80. It is very similar to WordStar operated in non-document mode, with one or two added features, such as the ability to restore a line that has been deleted with Control+Y.

Before starting the editor it is a good idea to use SETKEYS KEYS.WP so that the cursor keys return the usual WordStar values.

The text being edited is held in memory rather than being paged from the file on disc. This has the advantage of being very fast when going from one end to the other but has the serious limitation that the maximum editable file size is about 55k.

When writing in a modular way this wouldn't be too great a problem except that the .PRN for a 50k source file will almost certainly be two or three times the size and therefore uneditable.

The Assembler

It is difficult when assessing a serious Z80 assembler not to draw comparisons with the industry standard – Microsoft M80. This is used by many major software houses. If Hi Soft want programmers to switch it needs to offer some compatibility.

Unfortunately, there are so many of M80 features that GEN80 doesn't support that the attempt cannot be wholly congratulated. For instance, why on earth does it omit the (presumably) easy-to-implement HIGH and LOW expression operators? And including DEFL but not its synonym, ASET, is unnecessarily limiting.

Starting conditionals with either IF or COND is all very well, but why must they end in ENDC when most people use ENDIF? Changing the order or precedence in expression evaluation is very questionable as it could lead to some obscure bugs.

Of course, anyone who already has M80 probably wouldn't think of using another assembler, so perhaps I'm being super-critical. Microsoft does charge professional type prices. M80 is well over £100 and does not include an editor.

Smooth operator

So, what does the assembler offer the new user? Well, obviously it accepts all the standard Z80 mnemonics and all the expected psuedo-ops are there – DB, DEFB, DW, DEFW, DS, DEFS, DEFL, EQU, ORG, END, IF, ELSE, ENDC. These are pretty standard to all assemblers so I won't waste space explaining them here.

There are added operations involved with the production of relocatable modules. The choice of whether the assembler is used in absolute mode or .REL file mode is made by an assembler switch. In .REL mode the following psuedo-ops are recognised – EXTRN, PUBLIC, ASEG, CSEG, DSEG, .PHASE, .DEPHASE.

Because symbols/routine labels may be declared in one module and used in another, you need to be able to tell the assembler not to flag an error when an "externally" declared symbol is encountered. The EXTRN operation is used for this and is followed by a list of any symbols that are not declared in the current module.

Similarly, so that other modules can "see" symbols declared in the current module, they may be declared PUBLIC. This, as the name suggests, means that they can then be referenced by any other module. It is when the modules are linked that all these cross-references are tied together. This is of course why the operation is called "linking".

Putting things in place

When generating relocatable code there is no notion of a fixed origin. It is only when the code is linked that definite decisions are made about where it will finally reside. Because of this, the code in each separate module is written as if it started at 0.

More than this, the actual program code is generally all lumped together in one area. The code segment and all the variables and data (DEFBs and DEFWs) are from the data segment. To tell assembler which of the two areas the code applies to there are two psuedo-ops, CSEG and DSEG that are hopefully self-explanatory.

If you want to generate code that must be linked to reside at a definite address then ASEG (absolute segment) is used. GEN80 does not support common segment code, though this is rarely used so it's not too great a loss.

It is quite possible that you will want to write a section of code that starts its life buried deep within one of your modules but at the end of the day will be block moved to 0C000h say before it is executed. Because of this, you will want all jumps and labels to be offset from 0C000h.

This is easy to achieve in GEN80 using .PHASE 0C000h and can be switched back to normal with .DEPHASE.

Making the most of macros

The assembler supports a simple form of macros with the MACRO and ENDM psuedo-ops – MACROS is not a small greek island, a macro is an often used bit of code that can be blocked together, given a short name and quoted wherever you would have typed all the associated code.

The classic example is how to exchange two of the 16 bit registers. Hopefully, it is obvious that pushing the two registers on the stack then popping them off in the other order will achieve this. So, every time you wanted to do this, you could include PUSH r1, PUSH r2, POP r1, POP r2 in your code. However, by including the following macro definition of the file.

```
xchg MACRO @r1, @r2
     push @r1
     push @r2
     pop @r1
     pop @r2
     ENDM
```

You could put **xchg DE,IX** in your source file if you wanted to exchange DE and IX, similarly **xchg IY,AF** would exchange IY and AF. When the file was assembled, the assemler would just replace the **xchg** instruction with the two pushes and two pops each time it was used.

The Monitor

There are in fact two monitors in the package, MON80 and the new ProMON. Rather confusingly they use different keys in operation so most people will probably stick to using just ProMON which contains more powerful and useful facilities. The keys used in ProMON are also the more obvious of the two sets.

Like SID, ProMON is a symbolic monitor. This means that when giving a disassembly, if a .SYM file has been loaded all the symbol references are filled in with their names. So, for example, if you have a message printing sub-routine at address 1234, as long as the routine has a name such as PRINT–MESS in the symbol file any CALL 1234 in the disassembly will appear as CALL PRINT–MESS. It is pretty obvious that this makes following your program about 1000 times easier.

The monitor shows a disassembly of about 22 lines of code, the contents of all registers (including the alternates) and a memory dump which can also be made to show the areas pointed to by the main register pairs.

In command inputs, the same expression evaluator used by the assembler can is valid. So, for example, you could set the memory pointer (which decides which area of memory appears in the memory display) to DE*3+HL .SHR. 4-217. The contents of a register may be used by including the register name in curly brackets.

The monitor supports all the commands that one would expect – fill, move or compare blocks, change regis-

ters, read a file, write a file, setup the FCB, search memory, disassemble, set breakpoints and execute code. However, these have some interesting options.

When searching you not only have the option of searching for hex bytes and Ascii, but you can also search for an assembler mnemonic given in the same form as the disassembler would generate the line. This means you can search memory for "CALL PRINT-MESS" which is very useful.

Miscellaneous breakpoints

There are several types of breakpoints that can be set. Not only can you set the usual sort of "hard" breakpoint, you can set breaks that require a pre determined condition to be satisfied for execution to stop.

Thus you could put a breakpoint at 0114h with the condition {DE}=37. Each time execution reaches 114, DE is checked and only if it contains 37 does execution actually stop. A watchpoint placed within a critical loop allows a check to be made on how many times it is executed. Profiling your code in this way can help to streamline it.

When it comes to executing the code there are various options. For example, one form is like a simple single step except that it means "go off and run the following CALLed subroutine at full speed then stop when you get back to the next instruction".

Another execution option causes a key-scan after the execution of each instruction. This means that even if an endless loop is entered a key can be pressed to get back to the monitor.

Perhaps the best feature of the monitor is the execute conditional command. This is similar to the conditional breakpoint mentioned above except that the test is not made at one set point but after each and every instruction.

The ring-bound documentation that comes with the package seems to cover everything, though a little more detail could have been afforded to the more complicated aspects such as the philosophy of why one should want to use relocatable code rather than absolute mode.

The manual is really four separate ones (editor, assembler, monitor and tutorial) with cards dividing each section. Though not including an overall index and having continuous page numbering strikes me as a mistake.

HiSoft was extremely receptive when I asked about a number of "inconsistencies". This will mean a number of important differences between the review copy and one which you buy in a shop. They will all be improvements.

Having had the opportunity to use M80, Maxam II and now Devpac 80, the best combination would be to use the editor from Maxam II (essentially Protext in program mode), the M80 assembler and the monitor from Devpac.

However, if forced to plump for one package I think you couldn't do much better than this new Devpac. True, the editor could be a bit limiting on very large files but you could avoid generating such large files.

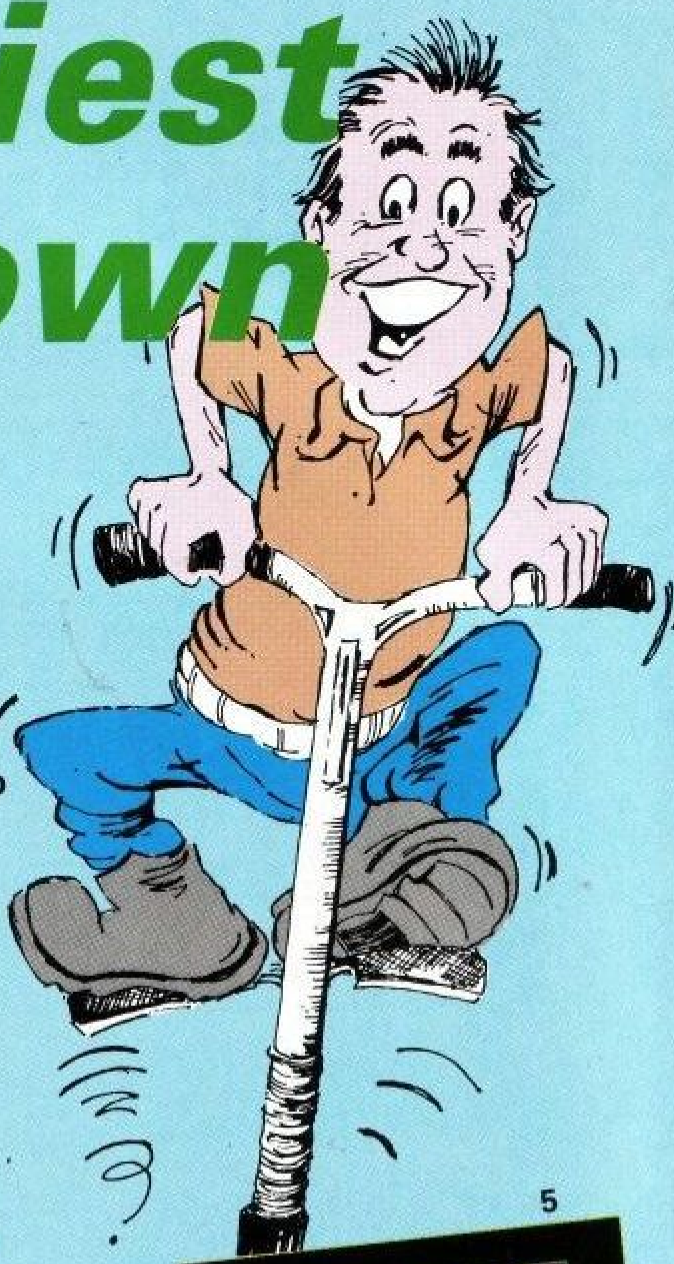
The assembler is certainly better than Arnor's offering, but still not a patch on M80. The monitor is very competitive and when you consider that you get all three for just £39.95 it really does seem like a bargain.

Existing owners of Devpac 80 can upgrade by sending back their old copy with a cheque for £15.

Devpac 80 version 2 is available from HiSoft, The Old School, Greenfield, Bedford, MK45 5DE. Tel: (0525) 718181.

ACU

The springiest THING in town



Do you remember when you helped Thing defeat the evil toy maker? He was the cutest, bounciest sprite this side of Tigger. Well now he's returned. Thing Bounces Back traces the further adventures of Thing with a stunning musical accompaniment. There is a review in this issue, and you will see that Liz fell in love with the green-headed shock absorber *(But then she has always been an odd girl* – Ed).

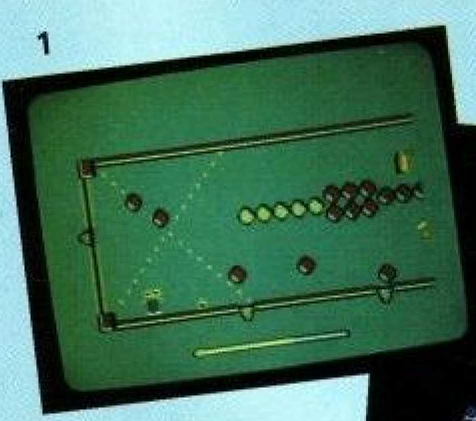
To get you into the bouncy spirit, Gremlin Graphics, purveyor of fine software to the joystick waggling fraternity, has come up trumps with the peppiest prize to grace our pages.

How to win

There are six prizes of *POGO STICKS*, the unipod with added zing. The ideal summer transport for anyone with a complex about their height. All you need to do is prove that you are a follower of Gremlin's digital dedication...

On this page you will find five screen shots from Gremlin Graphics games. What you have to do is identify them. It's not compulsory, and it won't affect your chance of winning but we would appreciate a passport photograph with your entry. We might print it if you win.

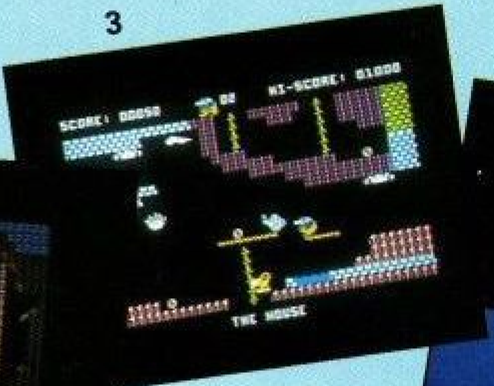
1



2



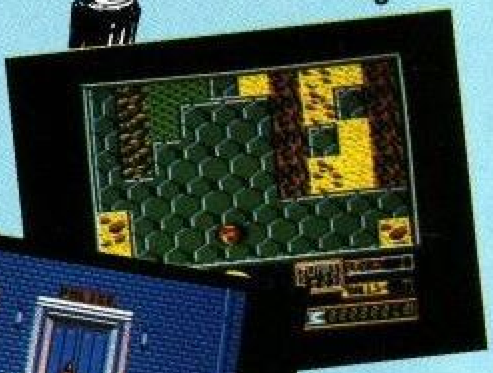
3



4



5



Rules

1. The winners will be the senders of the first correct entries drawn on August 10.
2. You may photocopy the form but only one entry is allowed per person (be honest now).
3. The judges' decision is final. What Simon says *goes.*

Send your entries to:
Gremlin Graphics Springy Compo
Amstrad Computer User
169 Kings Road, Brentwood,
Essex CM14 4EF

Entry Form

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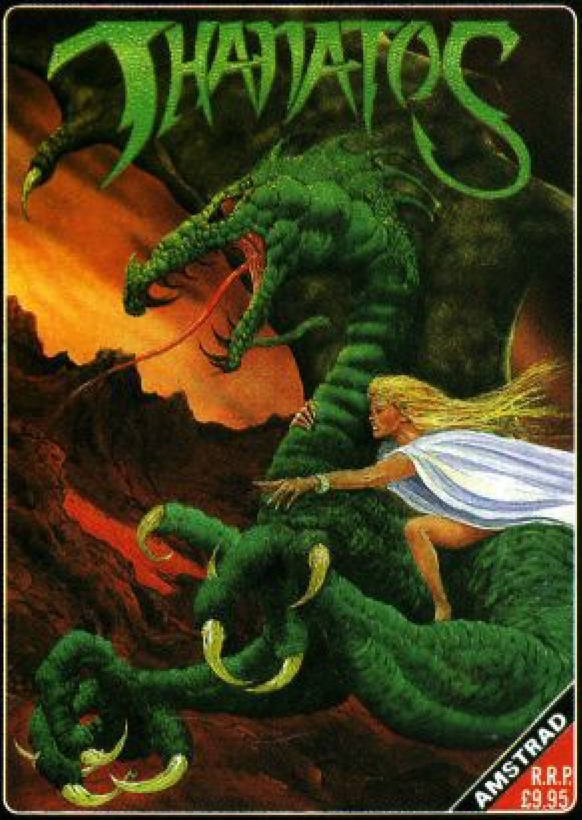
Put the names in the boxes

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THANATOS

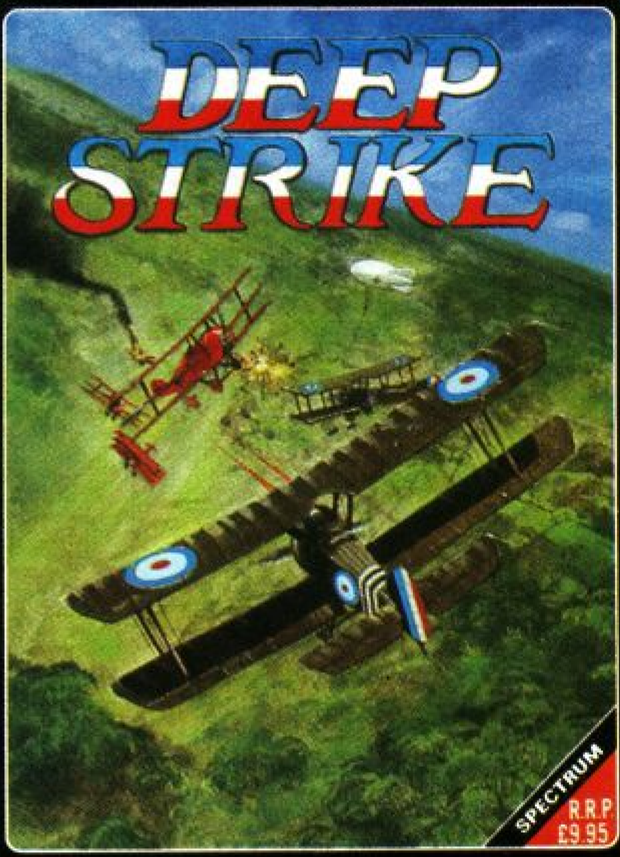
In this magical game you take control of a dragon, Thanatos the destroyer, whose eternal destiny lies in conflict with the forces of the underworld. The dragon which is very large and superbly animated, flies, walks, swims, and burns its way through the landscape. The game features fantastic landscapes with a totally new panoramic scrolling action.

"Wow! This game is really amazing, stunning, astounding, brilliant! The tune on the title screen is very nice, but the graphics are absolutely superb." CRASH, December 1986 (overall rating 93%)

£9.95 Spectrum cassette
£9.95 Amstrad cassette, £11.95 Amstrad disk (£9.95 by mail order)
£7.95 Commodore 64 cassette, £9.95 Commodore 64 disk





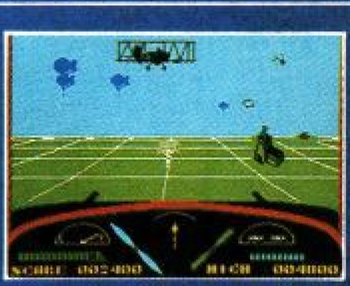


DEEP STRIKE

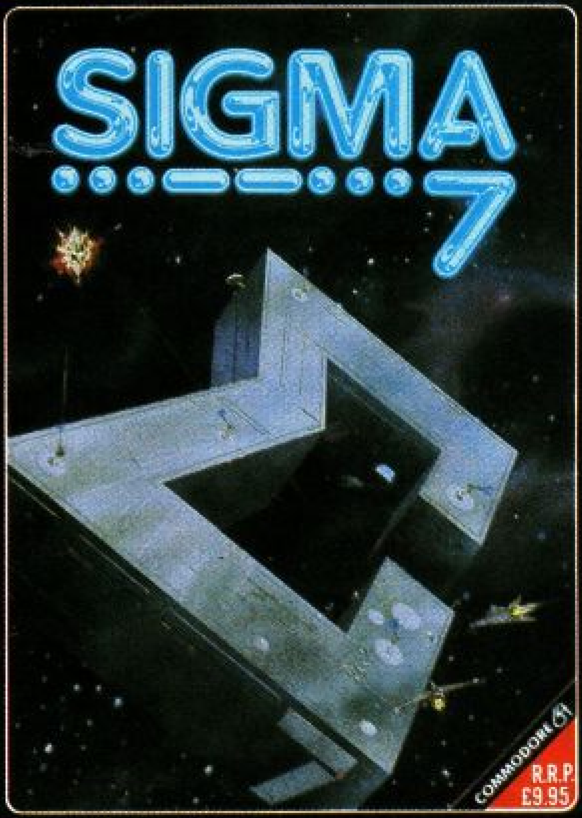
At last an opportunity to try your luck against the Red Baron and his flying circus of World War I flying aces. This game not only lets you take-off in a fully armed fighter, but also gives you control of the four bombers of your DEEP STRIKE attack force. It uses the latest techniques to bring you a smooth-scrolling and tilting 3D landscape viewed from the cockpit in full colour.

"...after a few games I really got into it. The way you can bomb the ground features (especially churches) makes the game much more enjoyable than if you just had to shoot planes!Overall a game that you should come back to quite a lot in the future." AMTIX, February 1987 (overall rating 71%)

£9.95 Spectrum cassette
£9.95 Amstrad cassette, £11.95 Amstrad disk (£9.95 by mail order)
£7.95 Commodore 64 cassette, £9.95 Commodore 64 disk







SIGMA SEVEN

An all-action arcade game featuring imaginative state-of-the-art 3D graphics and exciting synthesised sound. There are seven increasingly more difficult stages to the game which starts-out easy but ends-up almost impossible. Each stage is split into three phases : first take a space-fighter and blast your way to the next station through swarm-mine defences, then free that station's internal pathways of killer-robots and radioactive deposits, to finally reach the remote-controlled main panel which must be reset within a critical few seconds.

"I really like this – it has three neat mini-games all of which are very playable and addictiveThe graphics are really crisp and clear with a beautiful starry backdrop..." ZZAPP, February 1987 (overall rating 70%)

£7.95 Spectrum cassette
£7.95 Amstrad cassette, £11.95 Amstrad disk (£9.95 by mail order)
£9.95 Commodore 64 cassette, £9.95 Commodore 64 disk





DURELL

DURELL Sales Dept.,
Castle Lodge,
Castle Green,
TAUNTON, TA1 4AB
Som, England.

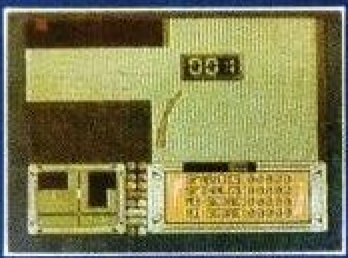
Telephone: (0823) 54489

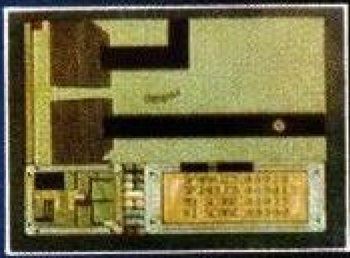
FAT WORM BLOWS A SPARKY

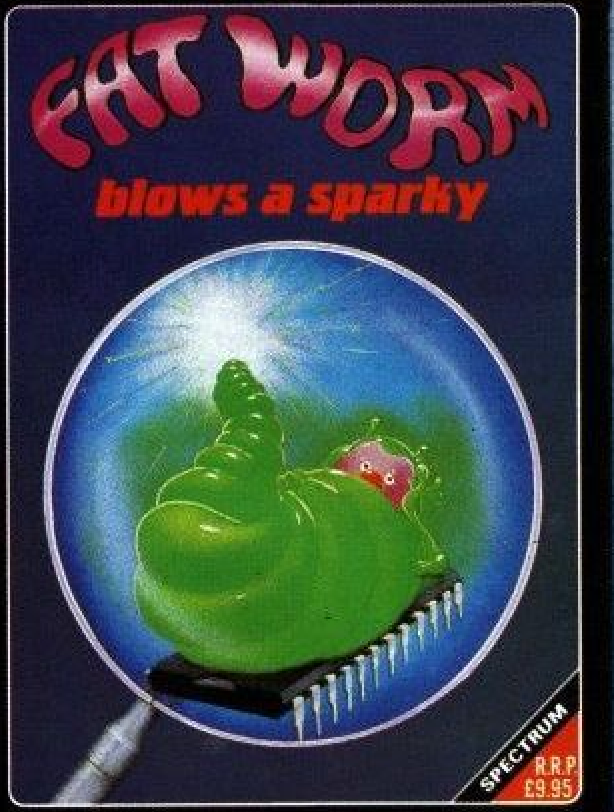
Now for something completely different. You are an insidious little wormie being chased through a Sinclair Spectrum by creepers in sputniks and crawlers on feets. Defend yourself by shooting burper sparkies at the crawlers, and blaster sparkies to take-out the sputniks. You'll see the computer board in a smooth-scrolling 3D viewed from above, as you crawl around in search of a disk drive on which to clone yourself.

"Playability and addictiveness are of the highest standard, but as for the graphics – well, what can I say! As far as animation and solid 3D goes, this is probably the best I have ever seen" CRASH, November 1986 (overall rating 95%)

£9.95 Spectrum cassette only









SABOTEUR II – Avenging Angel

A follow-up by the original author, where as the Ninja's beautiful sister, your mission is to revenge your fatally wounded brother. The rebels have found that the disk he stole in "SABOTEUR" also contains data for one of the dictator's missile silos. Your job is to fly in by hang-glider, fight your way through the security guards, pumas, dogs and radio-controlled robots, to seek out some top secret punched tape to activate the missile's launch control. Launch it, disable the electric perimeter fence, then break-out by motor-bike. Over five hundred locations, three buildings, underground caverns, intelligent guard dogs and stupid guards.

£7.95 Spectrum cassette
£7.95 Amstrad Cassette, £11.95 Amstrad disk (£9.95 by mail order)
£7.95 Commodore 64 cassette, £9.95 Commodore 64 disk







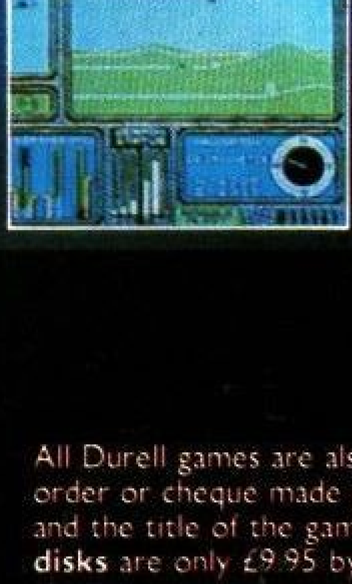
BIG 4

A compilation of Durell's four great smash hits : COMBAT LYNX, SABOTEUR, TURBO ESPRIT, and CRITICAL MASS.

"All of these megagames charted, all of 'em are winners. If you've spent the last eighteen months begging, borrowing and swopping trying to get hold of these titles, now you can relax;Only Beethoven's Quartets beat this fun foursome – Gimme! Gimme! Gimme! YOUR SINCLAIR, December 1986 (overall rating 9 out 10)

"Unlike most compilations where one title carries the others, the BIG 4 are actually four big games. A collection worth collecting." C & VG, December 1987

£9.95 Spectrum cassette
£9.95 Amstrad cassette, £11.95 Amstrad disk (£9.95 by mail order)
£9.95 Commodore 64 cassette (also on two "Duo-Disks" @ £9.95 each)





MAIL ORDER

All Durell games are also available by mail order, with no charge for postage or packing. Just include a postal order or cheque made payable to "Durell Software Ltd", along with your name and address, your computer, and the title of the game you wish to purchase. Your game will be sent by return-of-post. **Note: Amstrad disks** are only £9.95 by mail order!

STARFOX

"Wouldn't it be strange if you could have a game where the enemy could have smart bombs".

A new game from Realtime is something special, and the newest game, Starfox, is the most special.

A long, long time ago in a galaxy far away ... the Hyturian solar system was a peaceful place. Well, the inhabitants had learned to settle their differences.

Like any good, friendly community, the peoples of Hyturia wanted to defend themselves, and to this end they built a vast protective cube called *The Rubicon*. This protected the space lanes from evil pirates and all the Hyturians could trade in peace.

Unfortunately, as any Novienian will tell you, impenetrable barriers aren't . . .

After the traditional period of peace, which only happens in pulp science fiction stories when things are about to go wrong, something went wrong. A ninth planet, with no regard for the laws of physics, appeared. Its inhabitants had no regard for the laws of common decency and went about blasting Hyturians to kingdom come.

Fortunately, the Hyturians had an unpleasant fellow in their midst: Star Admiral John da Silva, a kind of latter day Long John Silver – one leg, no parrot. He had built a spaceship with which to defend the solar system. The ship was called Starfox and all he needed was a pilot.

You step into the pilot's seat of the Starfox. First task: To familiarise yourself with the controls. The ship is glass-fronted – struts divide the top, bottom and two side screens. Rails along the struts indicate damage status.

There is full joystick or keyboard control, with an auto locate device to turn you towards an enemy when you are in mid-battle, plus a number of keyboard-only options, such as battle status and holocube select.

The holocube is your map of the solar system. It starts as an empty box with a yellow corner as a reference point – after all, in space there is no up or down. Your ship starts in the centre. The sides of the cube are measured in units, each side being 100 long.

As you trek through space the details are logged. Alien convoys are shown in blue, planets in red. To determine where your ship is in relation to another object it is possible to rotate the cube.

To find your feet you will want to fly around for a bit, find a few alien convoys and blast them. You are armed with a simple Mark I laser. At the beginning of the game this is quite adequate – a simple zap and the alien antagonist explodes into a large fireball.

Things get tougher and you will need stronger weapons. The computer informs you as to which weapon is required to destroy an individual attacker, and this is the crux of the game.

Once you have used the improved weapon, and the alien knows about it he (evil aliens are *always* male) will develop such a device with which to assail you.

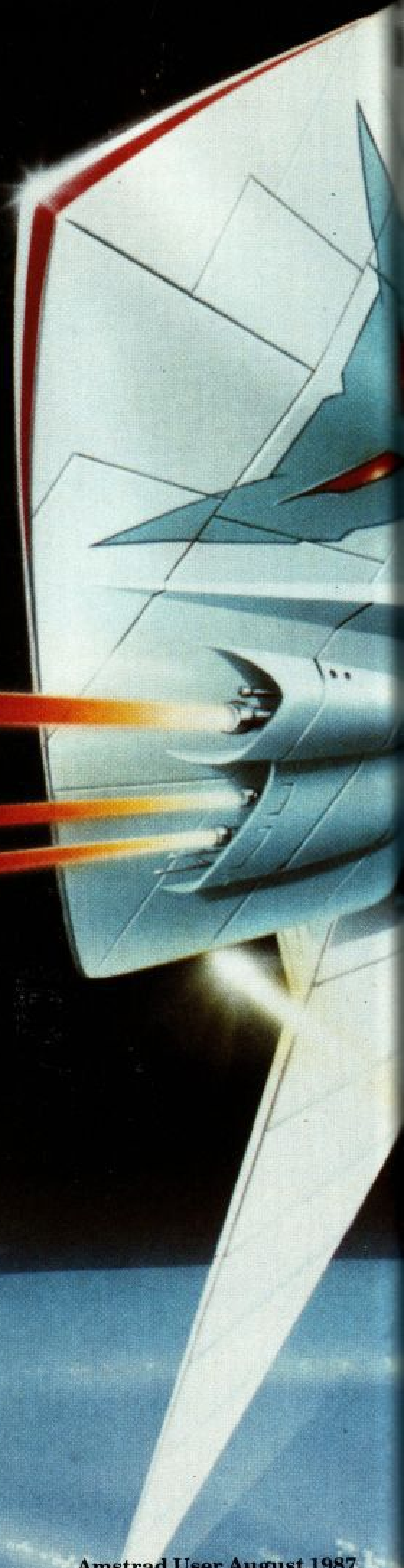
Of course this takes time, so the aliens need a whole level in which to work away in smelly alien laboratories. But at the beginning of the next level you had better be prepared for a well-equipped alien to come gunning for you.

As time goes on you enter an arms race. If you run too far ahead of the enemy he will catch up at the end when you run out of new weapons.

The ultimate weapon is the smart bomb. This must be used at the end – if utilised too early the foe will attack you with something you can't defend against.

Armaments are available from the eight planets of the solar system. To reach them you must fly down a warp hole, find a base and reverse into it.

In a fixed orbit





By
Simon
Rockman

you are unable to loop the loop or fly backwards: You must fly forwards and turn. The rear view scanners are useful for this, but be warned that the scanners are more powerful than your forward vision. The base may appear behind you with the message "Base In View" but when you turn it has gone. With the courage of you convictions you should fly forwards and the base will appear.

To complete a level you must destroy a number of aliens, perform a task, such as finding an electrical storm, and ferry a passenger.

The passenger will be involved in a big trial. A captured alien has been charged with genocide. You have to get him, the judge and a witness to the right place for the trial to progress.

One thing you cannot get from planets is fuel – this is delivered from motherships which ply between planets. If you see one it is worth checking the holocube to determine the location in case you need to refuel later. You must stop to refuel, and this is a task which is impossible – indeed forbidden – while you are in battle.

The disc version shows the mothership. On tape the fuel just appears and descends to your refuelling bay. There are quite a few features which have been added to enhance the Amstrad disc, not least a comprehensive cheat mode – Reaktor is keeping secret.

While dealing with the space fiend you have a number of aids. You may select from one of three weapons you have picked up from a planet. When the enemy hits your shield it is shown as a red blob.

If you are using a weapon which does not wipe out the alien with a single blow the other ship will be weakened, but if you should flee from the convoy it will recuperate.

I found fighting difficult, the controls being a mite sluggish and the crosshairs too low. You need to look over the framework of the craft's nose to get a full view.

Starfox reminds me more of Starstrike II than of any other Realtime program, but I'd say it is more fun. Realtime claim that it is the most difficult project it has undertaken. The whole concept was put together by James Poole at Ariolasoft, who started with the idea: "Wouldn't it be strange if you could have a game where the enemy could have smart bombs".

Familiarity has bred love at an initially hostile Realtime: The two companies seem to work well together, but then both are professionals.

There is some ace programming in Starfox. For example, the explosions are fast and smooth – they hide stars and look great when you hit one ship and another flies through the ensuing explosion.

There is a lot of mathematics involved, but then the programmers met while studying Maths at Leeds – so if you want to be a top programmer you'd better not forget all that O level stuff you spent the summer swotting up on.

However, the men from Leeds don't want to make life unnecessarily difficult and use an advanced assembler, based on the Apricot, called PDS. The software alone costs over £600, but they feel it soon pays for itself in the time saved when programming. Ariolasoft is clearly happy with the assembler and a number of the company's programmers use it.

At £9.95 for the tape and £14.95 for the disc Starfox may not be the cheapest game to have entered the portals of the *ACU* office this month. But it is the best.

Starfox is available on the Reaktor label from Ariolasoft (01-836 3411), at £9.95 on tape and £14.95 on disc.



DIGITAL DISSECTION

A monitor is not a box like a TV screen – well, it is sometimes. But it can also be a program which is used for looking at the insides of other programs. Ultramon is a new monitor from Bubble Bus. Dr Garvanovic offers his *prog* nosis.

EVERY now and then the Ed will send me a piece of software with the aim of making my job just a little easier. Having already seen, and forgotten, quite a few programs, I don't relish the thought of having a look at another one.

Fortunately, Ultramon was an exception. The modest packaging gives the impression of a very unprofessional package, but looks can, and do, deceive. When run Ultramon greets you with a screen full of numbers and figures, and a very full 80 column screen it is too.

A quick look through the small (but well written), manual informs you of it's many wonders. These include the usual move, disassemble and edit memory commands and a few rather special extras.

One command that isn't present though is a byte search. This omission, especially for hackers, is quite major: I can't have those 3E,3 (LD A,three lives in a game) sequences avoiding me, can I? The special commands, especially those connected with accessing the disc drive, more than make up for any inconvenience caused though.

Ultramon really excels when it comes to the little extras that are not generally found in other monitors. These include disc formatting and editing, and the Spectrum tape routines – more of those later.

As well as allowing you to format using the standard DATA,SYSTEM and IBM systems it will also let you customise the format, which is handy for protecting discs. When you wish to edit a disc the sector your editing appears in the main window and it's treated as if it was a section of memory.

This also means that your not directly editing the disc, but a buffer, so mistakes are not fatal.

Probably the most exciting features though are the Spectrum load and save routines. Imagine using an Amstrad, and discs, to load and hack, or just to examine some machine code written on the Spectrum. I will definitely be using this feature in the very near future.

To sum up this rather brief review. I wouldn't hesitate to recommend this to anyone, although the omission of that byte search command is a bit of a drawback. This package isn't really for the faint-hearted, as it can be a bit hard going.

The manual is small, and I think an example of each command might have helped the inexperienced.

One interesting thought though is of the size of the monitor: It's roughly 16k long, which means its just crying out to be put on rom. After talking to Bubble Bus about this there may be a rom version very soon, and that'll make me one very happy hacker.

Ultramon costs £14.95 (disc only) and is available from Bubble Bus who are on 0732 355962

The future's looking rosy for Arnold

Stephen Grainger talks to software houses about the CPC and finds that the machine we know as Arnold is still going strong.



The last six months have not been kind to the CPC. Sensation seeking reports have appeared in the computer press claiming that sales of the 464 and 6128 have fallen. A few software houses are claiming that they can no longer afford to support these computers.

Some experts say that this could mark the beginning of the end for the CPC and that Amstrad is purposely phasing the machine out, leaving the home market to be dominated by the Sinclair label which it also owns.

Why? Opinion is divided over what has caused the drop in sales: Some blame the introduction of the Spectrum +2, others say that the machines are too expensive for the home market. Certainly there has been a drop in sales.

But whether this drop is significant enough to stop companies writing and converting programs is another matter. After all, there are plenty of us out there with Amstrads, it's not just new owners who buy software.

To find out, I carried out a survey of the top software houses to discover their reaction to this news and in fact to the CPC range in general.

The survey was conducted by sending each of the software houses a questionnaire. It is their responses that have made up this article. The result is probably the clearest indication of the future of the CPCs. The questions are shown here as they appeared on the questionnaire, and the responses are shown as a percentage. The first questions were intended to determine what sort of companies write Amstrad software.

1. Which best describes your present policy towards CPC software?
a) Software is developed originally on an Amstrad 7%
b) Software is developed simultaneously on the Amstrad/C64/Spectrum/BBC/C16.................... 50%
c) Amstrad software is converted from another format at a later date 33%

As you can see, simultaneous development is still the most popular method of writing Amstrad software, and by far the most popular partner is still Ye Olde Spectrum.

Originality pays dividends – could this be the reason why the vast majority of CPC software fails to live up to the machine's capabilities? Just look at the programs that have been written originally for the CPC: Heartland from Odin, Spindizzy from Electric Dreams (released over a year ago and still the best), Equinox and Frost Byte from Mikro-Gen, and of course the oldie but goldie Yie-Ar-Kung-Fu. All of these were better on the CPC than any of the other formats, simply because they were designed for the CPC.

I'm not saying there's anything wrong with simultaneous development, but when programs have been designed for more than one computer it so often looks as if it has. The whole program has to be brought down to the standard of the least capable machine, usually the Spectrum.

Conversions, though, are the biggest cause of poor quality software for the CPC, and with a third of the market belonging to conversions it can so often mean a lot of bad software. And its not just the Speccy that's to blame here –

conversions from the C64 are quite often even worse!

US Gold seems to be the biggest culprit (although not the only one). Its products on the C64 and Atari are usually up to a very high standard, but when it comes to converting them for the Amstrad they fall to pieces. With the exception of one or two of the more recent games, much of the software is shoddy, and not worth the two quid budget price, let alone the tenner charged for it. Even Impossible Mission, which was delayed for a year, looked as if it had been rushed.

Compare this with a company like Arnor. It writes exclusively for the Amstrads – and it shows. Its software is almost always the best available for its designed purpose, and it almost never suffers delays in production. This may sound a bit like an advert for Arnor: It's not – I'm simply showing the difference in quality between original and converted software. Obviously this is not always the case and sometimes the conversions can be better than the originals – Sorcery from Virgin and The Sacred Armour of Antirad from Palace, for example. Unfortunately, this seldoms happens.

The second question was a simple follow up to the first:

2. Is this policy likely to change in the foreseeable future?

a) Yes	11%
b) No	89%
c) Don't know	0%

If yes, what is it likely to change to?

The fact that the vast majority of companies are not going to change their policy is undoubtedly a good sign, but what about the other 11 per cent? One company who were to change policy said that it no longer had any plans for the CPC in the UK, and would continue to produce it for Europe only or not at all.

The European market is something that keeps a lot of publishers interested in the Amstrad. Without it things would be a lot worse.

If you answer to question 1 wasn't A, have you ever written a CPC original?

a) Yes	60%
b) No	40%

If yes, what caused you to stop?

Guess what. Every single software house that answered Yes but no longer produces any originals, blamed the low volume of sales for the lack of success. Hardly surprising I suppose, but still a bit disappointing.

One or two companies had an open policy whereby they let the developers themselves choose which machine they used. To me this seems a good idea, and it's a shame that more companies don't adopt this flexible attitude. After all, surely you'll only get the best out of your programmers if you treat them right.

How much time do you spend developing CPC programs compared with those for other micros?

a) More	11%
b) About the same	67%
c) Less	22%

Notice how similar the figures are to the first question, except that the "cop-out" column grew slightly at the expense of the others. This is probably explained by the fact that, in general, originals take longer to develop while conversions can be (and by the looks of some of them, are) rushed through so as not to miss the boat.

Peter Sleeman worked for Electric Dreams/Activision at the time of the survey and has now moved to Argus Press Software. He gave the following reason why software houses spend less time on the CPC: "Main development systems exist for the Spectrum/C64 because they have been around a lot longer – Z80 based development often covers both the Spectrum and the Amstrad." And he went on to say: "There is simply not the availability of good Amstrad programmers".

Jon Baldachin, software manager at Virgin, blames the computer itself saying: "There are development restrictions due to the hardware architecture. No sprites, rom and ram usage by the system, restricted colour and screen functions". This seems a little hard on poor old Arnold. After all the Spectrum has no sprites, the Commodore has less usable ram and a CPC has more colours than both of them put together! Still I suppose he must know what he's talking about, otherwise he wouldn't be software manager at Virgin.

Of those who spent more time on CPC programs the main reason was that they were producing originals for the machine – which, as I said earlier, usually take longer.

One of the theories put forward about the Amstrad is that it is only really worth writing software for the machine if you release it on disc and sell it abroad, to Europe in particular. I decided to test the validity of this argument and asked the following two questions:

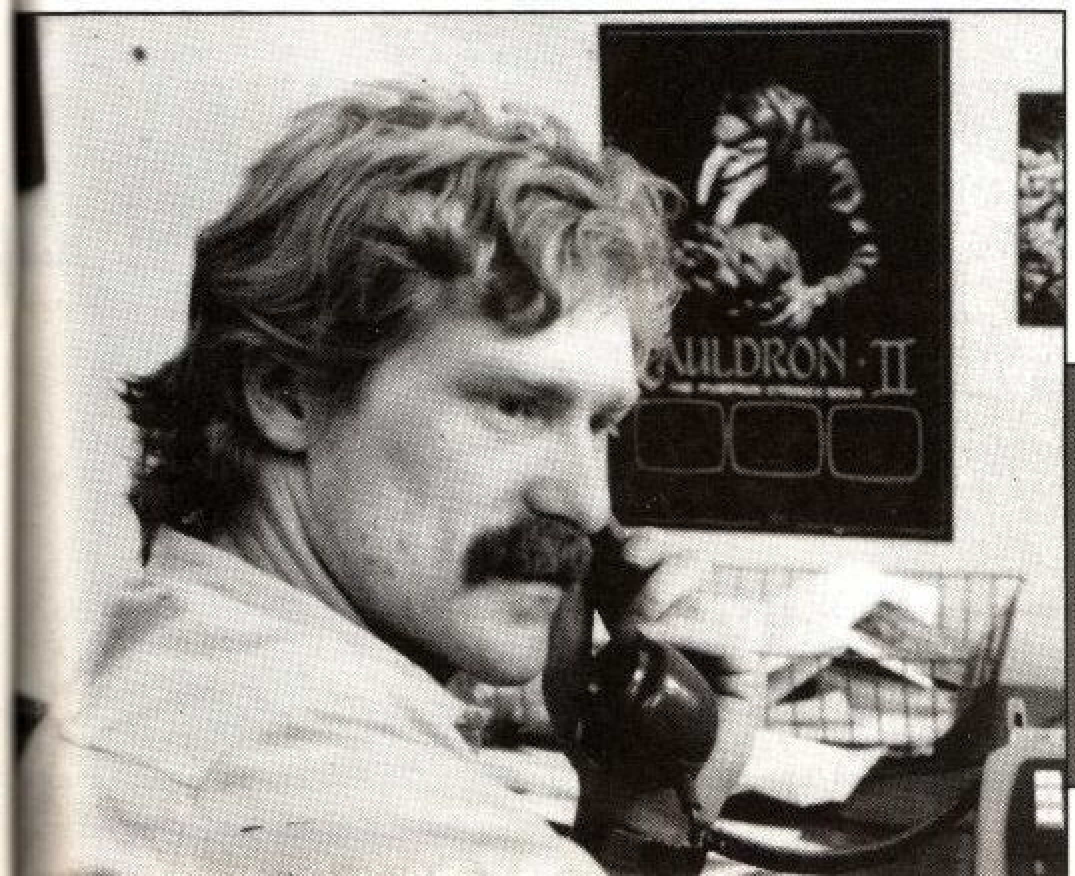
How many of your programs are available on disc?

a) All	88%
b) Selected titles only	6%
c) Recent releases	6%
d) None	0%

Which of the following places do you distribute to?

a) UK & Eire	100%
b) Europe	100%
c) U.S.A.	50%
d) Australia	92%

I think that proves that theory right!



Pete Stone of Palace thinks: "The drop-off started a long time ago. There was an initial surge when the 464 and 6128 were launched, but sales soon became selective and have been slowing down since the end of 1985".

Lets look at the discs first. 88 per cent of companies produced all their software on disc as well as cassette, so even at a cost of an extra £5 (in some cases) there's obviously a market. Software companies must have latched on to the idea that if a program is available on disc then the average 6128 owner would rather pay the extra than mess about using tape.

The idea that extensive distribution, particular to Europe, is necessary for an Amstrad program to sell well cropped up quite a lot in the replies I received. Pete Stone of Palace software was kind enough to explain the importance of good distribution.

According to his market research it would not be worth producing CPC games if it wasn't for the fact that the machine has done particularly well in four countries.

The first is Britain: CPC sales are well behind the Spectrum and the C64, but they still amount to a significant figure. More importantly though, the Amstrad has also sold very well in Germany, Spain and France. In Germany the CPC sells second to the C64 and at one point in early 1986 looked as if sales would be greater than even the Commodore, but since then they have dropped off slightly.

In Spain the Amstrad is in second place again, though this time it's to the Spectrum. According to Pete Stone the CPC is doing "reasonably well" in this country. France is the market where the Amstrad is doing best. It has been the top-selling home micro for over a year and the market is still expanding.

Taking Europe as a whole, the dominant machine is the C64 (which sells well in the UK, Germanic countries and Scandinavia but not the Latin countries), second is the CPC (which sells well in the countries above) and third is the Spectrum (which only sells significantly in the UK and Spain). In the USA and Australia the CPC market share is tiny, and the dominant machine is once again the Commodore 64.

The 50 per cent of companies which export to the US probably only sell C64 programs over there. Australia is a newer market and the CPC is probably second to the C64 or third to MSX. The continent's proximity to Japan means that there is a strong Japanese proclivity.

Because of the lack of home-grown software it is unlikely that Amstrad will be able to introduce the Spectrum to Germany and France with any more success that Sir Clive had. Therefore it looks as if at least in these countries the CPC will remain Amstrad's top-selling range and the major competition for the C64.

Back to the questionnaire though, and the next question I asked was one it seems everyone has a strong view on:

Do you think that the drop in sales of the CPC range is due to the release of the Spectrum +2?

a) Yes	33%
b) No	56%
c) Don't Know	11%

The results of this came as a bit of a surprise to me. I thought that a lot more people would have blamed the +2, particularly as the first reports of the drop in sales came only a couple of months after the launch of the new Spectrum, which seemed to indicate that the two events were not a simple coincidence.

Pete Stone of Palace thinks differently: "The drop-off started a long time ago. There was an initial surge when the 464 and 6128 were launched, but sales soon became selective and have been slowing down since the end of 1985". *(An odd statement since the 6128 only went on sale in September 1985 – Ed)*

Jon Baldachin of Virgin agreed with Pete Stone that the sales drop was unrelated to the launch of the +2 and backed up his argument with some valid points: "The price of a CPC is too high when put against machines like the C64, the Spectrum, the PCW and the PC1512" he said "People no longer need to buy a monitor with the machine. Those who do have already bought theirs."

Whether the price is too high is debatable, particularly when you consider you do get a monitor included in the price. Assuming for a moment that the Amstrad was sold without the monitor, would it have fared any better?

Sales of the Amstrad were very good, especially when you consider the sort of machines that were failing to sell at the time. The Memotech MTX 512 was probably a better computer on paper than the 464, as was the Tatung Einstein, but both failed to capture the imagination of the public. *(I blame the graphics chip they used – Ed)*.

Amstrad's success was in no small part due to it being a complete system, a system that was seen by a lot of first time buyers as the best, simply because it looked the most professional. It was Alan Sugar's declared intention to sell CPCs "to the lorry driver and his wife".

Without the monitor, the price of a 464 would be down to about £160. It would have looked far better value than the 48k Spectrum (which at that time still didn't even have a decent keyboard) and the C64 which would have weighed in almost £40 more expensive.

It is difficult to say whether selling the CPC without the monitor would have caused enough initial interest (when software was still a bit thin on the ground) to allow it a foothold in the market.

If it had, the machine would probably be more successful today, but if not the CPC would be long forgotten by now and Alan Sugar would be back to selling car aerials! Since he is the multimillionaire and I am the humble journalist I suspect his decision was the right one.

Jon Baldachin also claimed: "Software development is restricted by the lack of detailed technical information available. Cassette is still the major format due to the price of discs".

This is an argument that Amstrad would strongly refute: 50 464s were hand-built and lent to software houses before the launch. The firmware manual is more explicit than any other manual sold by a computer manufacturer from launch and many aspects of



Geg Follis of Gargoyle/FTL argues: "We suspect that the CPC public is not as games-orientated as the Spec/64 audience and of course there are only a quarter as many".

the 464 specification were designed to make conversion and programming simple.

Getting back to the point though, not everybody thought that the +2 was entirely blameless. Peter Sleeman of Electric Dreams said: "Sinclair is a better known computer name and the +2 is seen as the next step up. It gives the 464 an air of obsolescence". Just how a machine first made five years ago can make a machine first made two and a half years ago look obsolete baffles me but as somebody famous once said, "Computers. It's a funny old game!"

Greg Follis of Gargoyle/FTL disagrees, and goes on to say: "We suspect that the CPC public is not as games-orientated as the Spec/64 audience and of course there are only a quarter as many". This same point was echoed by several other companies, but for me the quote that says it all is from Dave Fisk of Arnor: "I don't think that Amstrad care about the 464. They are moving into the business market and are quite happy to let the Spectrum rule the games market. After all, they own them as well.

Do you think that the CPC range will suffer a further drop in sales with the introduction of the Spectrum +3?

a) Yes	100%
b) No	0%
c) Don't know	0%

Well that's a bit more decisive!

Several companies who answered "yes" to the previous question also stated that they thought the decrease in sales would continue whether the +3 was launched or not – the +3 would merely be another nail in the coffin. Peter Sleeman of Electric Dreams said "I think the +3 will have the same effect on the 6128 as the +2 had on the 464".

Another software house said: "Assuming the +3 is fault-free, has a degree of CP/M compatibility and that Amstrad reduce the price of discs to coincide with its launch the +3 should do very well".

I'm going to stick my neck out here and go against what everybody else has said. I think that the +3 might not be particularly successful – well, not as successful as Amstrad will be hoping. Most people who buy a Spectrum use it either as a games machine or a general home computer on which they'll do a little bit of programming. I can't see any real advantage (except for the reduced loading time) that a disc drive would have for this kind of user.

It seems academic whether CP/M compatibility is included or not, because unless Amstrad is looking for a new audience for the Spectrum (which is unlikely), the existing user would have virtually no use for it. Most people who want these facilities would, in my opinion, still choose the 6128 despite the fact that its £100 more expensive. Remember a Spectrum only has a 32 column screen, so CP/M is of limited use.

There, I told you I was sticking my neck out!

This little theory of mine is not entirely without evidence. At least one software company blamed the 6128 disc system for the drop in sales of the whole CPC range, saying: "The problem lies with the disc-based machines and the price of the discs. The majority of CPC users appear to be older than the majority of Spectrum users and therefore are disc biased. However, few people want to spend £15 on a game for a £250 machine".

If CPC users who, lets face it, tend to use a wider range of software, are not willing to spend extra for disc software what chance is there for the Spectrum which is used almost solely for games? Incidentally the survey was incidently taken *after* the price reduction of 3in discs.

The "all in one" marketing technique now used on the Spectrum (built in datacorder, disc drive and so on) is something that Amstrad has been perfecting ever since its main business was making hi-fis. Without Amstrad's takeover of Sinclair the chances are that the +2 and +3 would never have been made (especially considering Uncle Clive's obsession with Microdrives), and the CPC might not have been in this position today. All this brings me quite nicely to my final question:

Do you think that Amstrad's take over of Sinclair was good for the home computer industry as a whole?

a) Yes	17%
b) No	33%
c) Don't know	50%

Of those who expressed a preference, the consensus is that the industry would have been in a better position if there were still three major manufactures in Europe rather than two. Richard Bason of Piranha commented: "It must be difficult for Amstrad to be serious about two machines in their range which compete for similar sections of the market".

Of those who answered "don't know", several could see both good and bad sides of the takeover. Peter Sleeman was typical, saying: "The takeover was better for the market place size



Richard Bason of Piranha commented: "It must be difficult for Amstrad to be serious about two machines in their range which compete for similar sections of the market".

providing more commonality of machines. Whether it pushes machine standards up as well is debatable."

Whether the takeover was a good thing is an argument that will probably reign for along time. The fact of the matter is that Amstrad has bought out Sinclair, and looks to be using the Sinclair label as its vehicle for the home market, whereas the actual Amstrad name will probably be used for its business machines.

At the moment though, Amstrad is stuck with two different ranges of micros in the home market. And no doubt, even within Amstrad opinion will be divided over which range should be supported, or whether the machines should be sold side by side and marketed in such a way as to make each machine sell to different sectors of the same market.

There is no place for sentimentality in the computer industry – look at what happened to Acorn once it started getting sentimental about the BBC model B: And, to a lesser extent,

Sinclair and his Micro-drives. Alan Sugar is unlikely to let anything like that happen to Amstrad, and he is not afraid of discontinuing a machine if he believes it's necessary (the CPC 664 for example).

The big question is, Will he kill off the CPCs and concentrate on the Spectrum range.

Despite all the fuss, the CPC range is in no immediate danger. One thing the survey did show was that although the CPC may lag well behind the Spectrum (in terms of sales) in this country, the CPC is a far more "international" machine. It sells well in four countries compared with two in the Spectrum's case. When Europe is taken as a whole, sales of CPC software actually outnumber sales of Spectrum software.

Software houses, like all businesses aim to make a profit. They will produce programs for a machine for as long as it is commercially viable to do so. All the large software houses export to Europe where market is rock solid, so there should be no shortage of quality software.

For the next year at least, the CPCs and Spectrums are likely to be on sale side by side, competing for the market in much the same way as they are doing now. It is highly unlikely that Alan Sugar will try killing off either of the machines completely, because in doing so he is bound to lose some of the markets (probably to Commodore) he has worked so hard to create.

Editor's opinion

The CPC is unlikely to beat the Spectrum in the UK, but sales are improving. A year ago less than 10 per cent of programs sold were for the CPC, now this is closer to 16 per cent. There is no reason to doubt that this trend will continue, so although sales may not be all the software houses would want the Amstrad holds a firm third place behind the C64 and Spectrum.

Something which many software houses find disturbing is the emphasis on budget and compilation tapes. When a one-off game sells for £9.95 it is much more tempting to go for five £1.99 programs.

Perhaps Amstrad owners are not so keen to be seen with the latest game, or perhaps they just don't have as much money to spend on software.

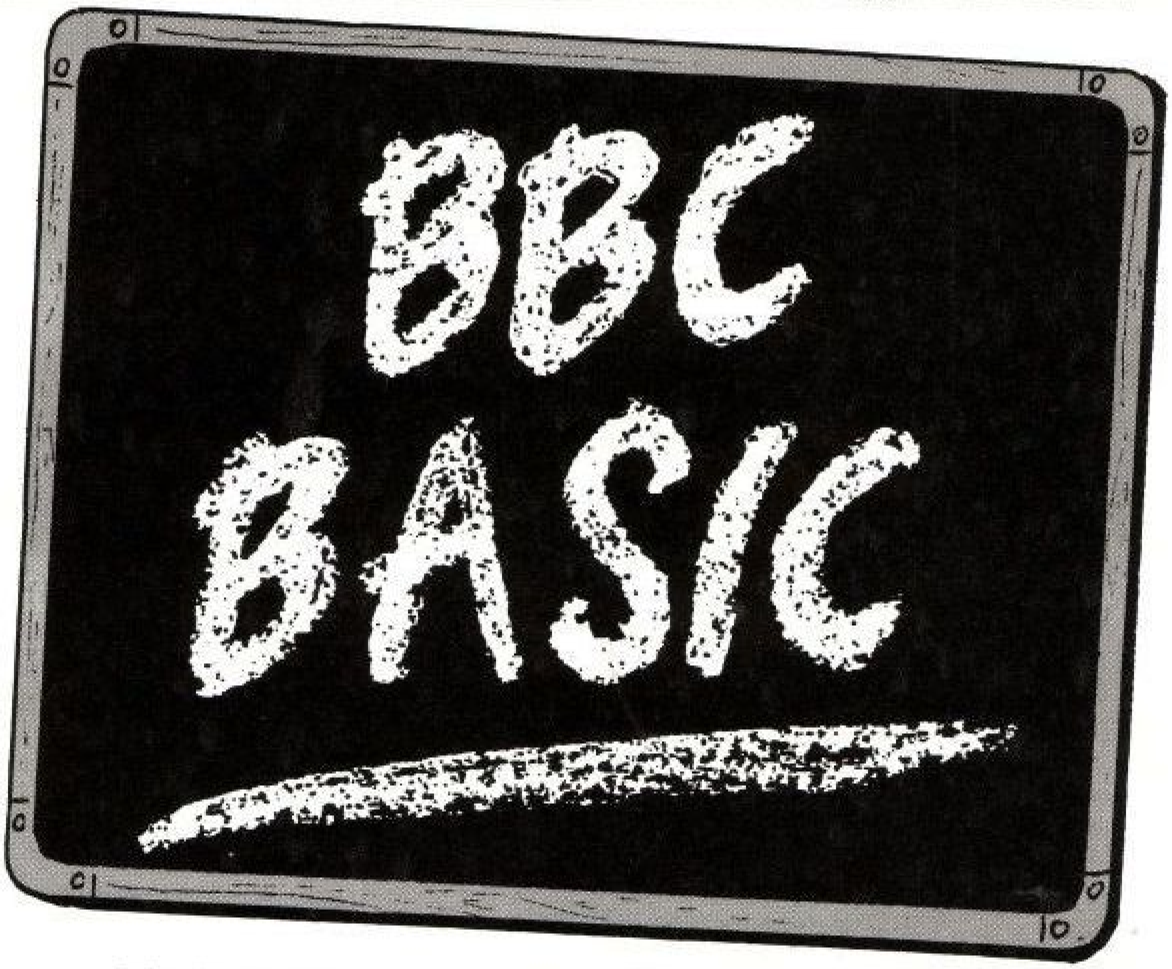
The drop in disc prices will continue – the PCW has no doubt helped the format – and the new Spectrum +3 should be a further boost to sales.

This article has emphasised the strength of the Amstrad overseas: The continued demand for software in Europe will not only encourage UK producers to write games for the CPC, but will also result in more imported titles. Infogrammes has set up a UK office, Ariolasoft has imported the excellent Werner and Activision has a deal with Loricels.

Sitting in an editorial office in Brentwood it is difficult to know what is going on throughout the world. If you work for a software house, or use a CPC outside the UK, then please write with your views on the survey.

The CPC started late, the C64 and Spectrum had a lead of years in software development and in establishing themselves. The CPC has been bought by over a million people, a number which will ensure a healthy future for our Arnold.

ACU



You can now run the computer language used in schools throughout the land on your 464 with discs, 6128, PCW or PC. Richard Sargent looks at whether you'd want to.

When the BBC decided to launch a computer literacy project a team of experts was put together to decide what was needed. They wanted a Comal-like language, Z80 CPU, Teletext, CP/M, and 8in discs. The target price was £100. The BBC Micro ended up being nothing like the machine they wanted, and Sir Clive, who could have done the job, was suitably miffed. Still every cloud has a silver lining and now the world is richer to the tune of a new Basic – BBC Basic.

Owners of disc-based Amstrads have a good choice of Basics for their program development now that BBC Basic is available for all Amstrads running CP/M 2.2 or CP/M+. For CPC users it is of course Locomotive Basic which takes pride of place in their machine, but some may have abandoned Locomotive, perhaps only temporarily, in favour of Mallard Basic or MBasic, both of which are available for these computers on 3in disc running under CP/M.

Now the chance to sample the language which launched the BBC's Computer Literacy Project is open to most Amstrad users – and at £29 for the privilege there are likely to be a lot of takers.

BBC Basic is undoubtedly one of the superior variants. It supports procedures, so it's more structured than Locomotive, and it has good file-handling commands, including the ability to support random access files. These attributes make it suitable for use in schools and businesses.

Further, it has a generous range of mathematical functions and a built-in assembler, which makes it a Basic which can hold its own against other more specialised languages and has found favour at higher education levels too.

So, how has BBC Basic found its way on to Amstrads? The brief answer is that Acorn don't own the language, and that the BBC always intended that it should be widely available.

The reason why there aren't a vast number of non-Acorn computers running BBC Basic is that it requires a fair amount of programming skill to write a BBC Basic interpreter, the end result has to be good (who would want an inferior version?), and the BBC has to approve it (they set the original specification, and can veto non-standard versions).

Having said that much, it is almost a foregone conclusion that BBC Basic for the Amstrad, written by software house M-TEC, is good, because Auntie has officially approved it.

The preview disc under review here unfortunately had no manual because they were still at the printers, but the whole bag of tricks will be available by the time you read this. The testing was done on a CPC 6128 which has CP/M +, but the disc will also run under the CP/M 2.2 of an upgraded CPC464. Armed with the Help file from the disc (which lists all the BBC Basic commands) and a real BBC Basic manual (as supplied with the genuine BBC computer) I put my Amstrad in BBC mode . . .

Loading BBC Basic is simple. First select CP/M using the Amstrad's CP/M system disc, and then load the 17k file BBC Basic.COM. You are now running BBC Basic. Later you can put CP/M and BBC Basic on the same disc, together with some goodies to make it simple to get into BBC Basic as soon as you switch on your computer.

Once in BBC Basic, tread carefully – the finer details which make the language a pleasure to use represent stumbling blocks for unwary Locomotive freaks. Dir will give you a CATalogue, but will only list programs with .BBC extensions. There are plenty of these, so you could start by loading the benchmark timing program contained on the demo disc. This will tell you how fast BBC Basic runs. CHAIN "bench" does the trick. If you type chain "bench" you will be told, politely, that you are WRONG. BBC Basic likes its commands in upper case please. *dir was a disc-based command, not a true BBC Basic command, so there is no need for it to be in capitals while "bench" is a file name and so also doesn't require upper case treatment – you'll get to know and love these foibles.

```
10|CPM
SAVE "DISC"
```

Listing I: Creates DISC.BAS which is the CPC's auto-run file

```
10 PRINT "Press CAPS-LOCK, then '8' o
r '4' for 80/40 cols"
20 IF GET$="4" THEN MODE 1:NEW
30 CLS:NEW
SAVE "M.BBC"
```

Listing II: Creates the screen-choice file M.BBC

BBC Basic accepts abbreviated keywords too, so CH."bench" will run the official benchmark programs, and report that BBC Basic scores 19 seconds – about 7 seconds slower than the real BBC Basic and 5 seconds slower than Locomotive Basic.

Although BBC Basic is loaded from disc, and therefore occupies about 17k of RAM, there is plenty of free space left for user programs, particularly on the CPC 6128. On this machine Locomotive Basic's FRE(0) returns around 41000 bytes. The BBC Basic equivalent command is HIMEM-PAGE which returns 40448. Moreover, opening a channel doesn't reduce this figure,

whereas it does eat into Loco's 41000 by about 4k.

BBC Basic is here benefiting from CP/M +, which makes the most of the CPC 6128's paged memory. On CP/M 2.2 Amstrads there is less space for user programs under BBC Basic, but Locomotive Basic's situation remains the same.

With this generous amount of memory at your disposal, spare a thought for BBC Model B owners – in graphics mode they have 4352 bytes free and in 80 column text mode 8448 bytes. The original Acorn design – the Proton – which begat the BBC Micro had a 2k character mode. The BBC wanted teletext instead.

The BBC Basic commands are shown in Table I. Structured programming commands are represented by Procedures (DEF PROCname) and by the useful ON . . . GOSUB . . . ELSE (Amstrad's ON . . . GOSUB doesn't support the ELSE). Locomotive's WHILE . . . WEND is missing but is replaced by REPEAT . . . UNTIL. BBC Basic is worth buying just for the procedure calls alone, but there are more goodies lurking in the interpreter, not least of which is the in-line Z80 assembler.

Table II shows the impressive list of functions, and you will note that maths functions feature largely.

"Indirection" is the process which is provided by PEEK and POKE in most dialects of Basic, including the Amstrad Basics. BBC Basic has three indirection operators, the query (?) which performs PEEKs and POKEs, the pling (!) which does the same as POKE but transfers four bytes at a time, and the dollar ($) which transfers strings to memory. The latter may affect as many as 255 bytes, which is the maximum string size permitted. For example:

Y=PEEK(X) is equivalent to Y=?X
POKE X,Y is equivalent to ?X=Y

!M=&12345678 would load &78 into address M, &56 into address M+1, &34 into address M+2 and &12 into address M+3.

$M="ABCDEF" will place the Ascii characters A to F in locations M to M+5 and will load a carriage return (&0D) into address M+6.

Query and pling can also be used as binary operators so that, for example, M?3 means "the contents of memory location M+3". The left hand operand must be a variable, not a constant.

M is auto-incremented by the indirection operators, so a memory-investigation program can be performed in just a few lines. Here is a one-liner to examine 32 bytes of memory from address M onwards:

```
FOR X=0 TO 31:PRINT ^ M+X,
          ^M?X:NEXT
```

The tilde ˜ performs the same task as Locomotive Basic's HEX$ but suffers the disadvantage of not being on the Amstrad keyboard. Use CP/M's SETKEYS command file to program function key f0 to produce the tilde, ASCII code 126.

BBC Basic includes a Z80 assembler which loads its object code directly into the target memory area; the static variable P% is the program counter. The usual two-pass assembly is done by placing the source code in a FOR . . . NEXT loop.

All Z80 op-codes are supported, together with pseudo-ops DEFB, DEFW and DEFM; these write an 8 bit byte, a 16-bit word and a multi-character string respectively. Error reporting and listing are controlled by the pseudo-op OPT.

All is explained in the manual, and there are even examples of in-line assembly on the demonstration side of the BBC Basic disc.

The USR function and the CALL statement provide the interface between Basic and machine code. Both USR and CALL communicate with the Z80's registers via reserved variables of the same name – so register A is loaded from Basic variable A%, B from B% and so on. Lists of parameters may also be passed in a way which is reasonably similar to that used by Locomotive's CALL statement.

Converting any dialect of Basic to any other is never a five minute job and any Basic listing containing PEEKs,

```
10 X=OPENOUT "PROFILE.SUB"
20 PRINT #X,"PALETTE 59,0"
25 PRINT #X,"SETKEYS KEYS.BBB"
30 PRINT #X,"BBC Basic M.BBC"
40 CLOSE #X
50 X=OPENOUT "KEYS.BBB"
60 PRINT #X,"15 N S C ";CHR$(34);CHR$
(126);CHR$(34)
70 CLOSE #X
80 REM This program has now done its
task
90 REM and can be discarded.
```

Listing III: Creates the initialisation files PROFILE.SUB and KEYS.BBB

Command	Function
AUTO	Generate line numbers.
DELETE	Delete program lines.
EDIT	Edit a program line.
LIST	List all or part of program.
LISTO	Control indentation in LIST.
LOAD	Load a program into memory.
NEW	Delete current program & variables.
OLD	Recover a program deleted by NEW.
RENUMBER	Renumber the program lines.
SAVE	Save the current program to disk.
CALL	Call assembly language routine.
CHAIN	Load and run a program.
CLEAR	Clear dynamic variables.
CLS	Clear the screen.
DEF	Define a function.
DEF PROC	Define a procedure.
DIM	Dimension one or more arrays.
END	Terminate program and close files.
ENDPROC	Return from a procedure.
FOR	Begin a FOR . . . NEXT loop.
GOSUB	Call a Basic subroutine.
GOTO	Branch to specified line.
IF..THEN	Do statement(s) if exp non-zero.
LET	Assignment.
LOCAL	Declare variables local to procedure.
NEXT	End FOR . . . NEXT loop.
ON..GOTO	Computed GOTO.
ON..GOSUB	Computed GOSUB.
ON ERROR	Do statement(s) on error.
PROC	Call a procedure.
REM	Remark
REPEAT	Begin a REPEAT . . . UNTIL loop.
REPORT	Print error message for last error.
RESTORE	Reset data pointer.
RETURN	Return from subroutine.
RUN	Run the current program.
STOP	Stop program and print message.
TRACE ON	Start trace mode.
TRACE OFF	End trace mode.
UNTIL	Terminate loop if exp is non-zero.
WIDTH	Set terminal width.
BPUT	Write LS byte of exp to disk file.
CLOSE	Close disc file.
DATA	Data for READ statement.
INPUT	Request input from user.
INPUT LINE	As INPUT but accept whole line.
INPUT#	Read data from disk file.
OSCLI	Pass string to "operating system".
PRINT	Print data to console.
PRINT#	Write data to disc file.
READ	Read data from DATA statement(s).
VDU	Send LS byte of exp to console.

Table I: Commands

POKEs and machine code CALLs is probably not worth converting – life is too short. However, straightforward programs in BBC Basic/Locomotive Basic can be translated by paper and pencil method, or, more ambitiously, by performing surgery on the listing after loading it into a word processor. (Both BBC Basic and Locomotive Basic can produce the pure Ascii text files required by a word processor).

Expect to interchange commands such as VDU X and CHR$(X); LOCATE X,Y and TAB(X,Y) and so on, and be prepared to change parameters following commands such as RND and SOUND. Having both the BBC Basic and the Locomotive Basic manuals open on the desk at this time is virtually compulsory! Dedicated converters will probably want to consult the "real" BBC Basic handbook too.

```
100 REM Update a record in a file cal
led "phones"
110 R=203            : REM record number

120 L=40:            : REM length of rec
ord
130 N=123456:        : REM some new nume
ric data
140 N$="Brentwood": REM some new stri
ng data
150 file=OPENOUT("phones")
160 PTR#file=R*L
170 PRINT #file,N,N$
180 CLOSE #file
```

Listing IV: An example of BBC Basic's random access filing

Tests made in transferring programs between BBC Basic, Locomotive Basic and the Protext word processor proved to be perfect in the BBC Basic to Locomotive/Protext direction and satisfactory in the reverse direction. Locomotive Basic and Protext users will already know how to read and write pure Ascii files, but it is at the BBC Basic end that a slight hiccup exists. BBC Basic uses the cumbersome but reliable *SPOOL sequence to create an Ascii file, for example:

*SPOOL	Give the Ascii file a "myprog.asc" name
LIST	LIST the Basic program to the disc
*SPOOL	Terminate the disc operation

and myprog.asc can be read by Locomotive Basic and Protext. However, to load an Ascii file into BBC Basic requires the *EXEC command: *EXEC amstrad.asc

This was duly tried, and 99 percent of amstrad.asc loaded into BBC Basic – one spurious line number crept in the

Function	Action
ABS(exp)	Absolute value of expression.
ACS(exp)	Arc-cosine of expression, in radians.
ASN(exp)	Arc-sine of expression, in radians.
ATN(exp)	Arc-tangent of expression, in radians.
COS(exp)	Cosine of radian expression.
DEG(exp)	Value in degrees of radian expression.
EXP(exp)	e raised to the power of expression.
INT(exp)	Largest integer less than expression.
LN(exp)	Natural logarithm of expression.
LOG(exp)	Base-ten logarithm of expression.
PI	Returns 3.14159265.
RAD(exp)	Radian value of expression in degrees.
RND[(exp)]	RND returns random 32-bit integer.
RND(–n)	Seeds sequence.
RND(0)	Repeats last value in RND(1) form.
RND(1)	Returns number between 0 and 0.999999999
RND(n)	Returns random integer between 1 and n.
SGN(exp)	1 if exp>0, 0 if exp=0, -1 if exp<0.
SIN(exp)	Sine of radian expression.
SQR(exp)	Square root of expression.
TAN(exp)	Tangent of radian expression.
ASC(str)	Returns ASCII value of first char of string.
CHR$(exp)	Returns one-char ASCII string of exp.
EVAL(str)	Evaluates str as an expression and returns resulting number or string.
GET	Waits for keypress and returns ASCII value.
GET$	Waits for keypress and returns one-char string.
INKEY(exp)	Waits exp centiseconds for keypress and returns Ascii value.
INKEY$(exp)	Waits exp centiseconds for keypress and returns one-character string.
INSTR(r,s[,n])	Returns position of string s in string r, optionally starting at position n.
LEFT$(str,exp)	Returns leftmost exp characters of string.
LEN(str)	Returns length of string (0-255).
MID$(str,m[,n])	Returns sub-string from position m, of length n or to end.
RIGHT$(str,exp)	Returns rightmost exp characters of string.
STR$[](exp)	Returns string representation of exp in decimal (or hex).
STRING$(n,str)	Returns a string consisting of n copies of str.
VAL(str)	Returns numeric value of str.
BGET#chan	Returns a single byte from a disc file.
COUNT	Number of characters printed since last new line.
EOF#chan	Returns TRUE if disc file is at its end.
ERL	Line number of last error.
ERR	Code of last error.
EXT#chan	Returns virtual length of disk file.
FALSE	Returns zero.
FNname [(parameter list)]	User-defined numeric or string function.
GET(port)	Returns contents of Z80 port.
OPENIN(str)	Opens file for input/update and returns channel number.
OPENOUT(str)	Opens file for output and returns channel number.
OPENUP(str)	Same as OPENIN.
POS	Returns current cursor column (LHS=0).
TOP	Returns first address after end of user's program.
TRUE	Returns –1.
USR(address)	Calls machine-code routine and returns integer.
VPOS	Returns current cursor line (top line=0).
PAGE	Memory address of current user's program.
PTR#chan	File character pointer. Allows random access.
HIMEM	Top of memory used by Basic.
LOMEM	Start address of dynamic variable storage.
TIME	Elapsed time clock, counts in

Table II: Functions

```
***Note: This listing is not referred
 to in the text

AN EXAMPLE OF BBC Basic'S IN-LINE ASS
EMBLER (Listing 5)

100 DIM mcroutine 30 ; reserve space
for mcroutine
110 FOR pass=0 TO 1  ; standard 2-pas
s assembly
120 P%=mcroutine     ; set P% to star
t of mcroutine's area
130   [OPT pass*2    ; OPT=0 on 1st p
ass; =2 on 2nd pass
140   LD A,(IX):DEC A:JP NZ,label ; s
ome code & a branch
150   RET               ; is one end of
the routine
160   .label            ; branch destina
tion
170   ADD A,8:RET:]     ; more code & an
other RET end
180 NEXT pass           ; ] ended the so
urce code
190 CALL mcroutine      ; Call the machi
ne code routine
```

Listing V: An example of BBC Basic's in-line assembler

last second of transfer and had to be removed manually.

What is happening is that BBC Basic's *EXEC is reading the disc up to the physical end-of-file, which is at the end of the sector. Locomotive Basic ends its files with Control–Z and leaves any space between the Control–Z and the end of the sector holding junk bytes from previous disc use.

BBC Basic cannot help but read this junk which it might occasionally read as a spurious program line. Use clean disc to avoid this problem. It is at least reassuring that software transfer between the two languages is possible on the Amstrad computers.

The Amstrad CPC manual will tell you how to create a blank CP/M-format disc and how to PIP the files BBC Basic.COM, AMSDOS.COM, PALETTE.COM, SETKEYS.COM, SUBMIT.COM, KEYS.CCP and C10CP/M3.EMS onto it. (Note that C10CP/M3.EMS may be called something else on Amstrads other than the CPC 6128).

Listings one and two, given in this article, will allow you to put three files called M.BBC, PROFILE.SUB and KEYS.BBB on to the same disc, and these will let you start up BBC Basic very simply when you first switch on your computer, as well as providing the tilde character on key f0.

M-TEC can't do all the work for you since they cannot supply BBC Basic on a 3in CP/M disc for copyright reasons.

Conclusion

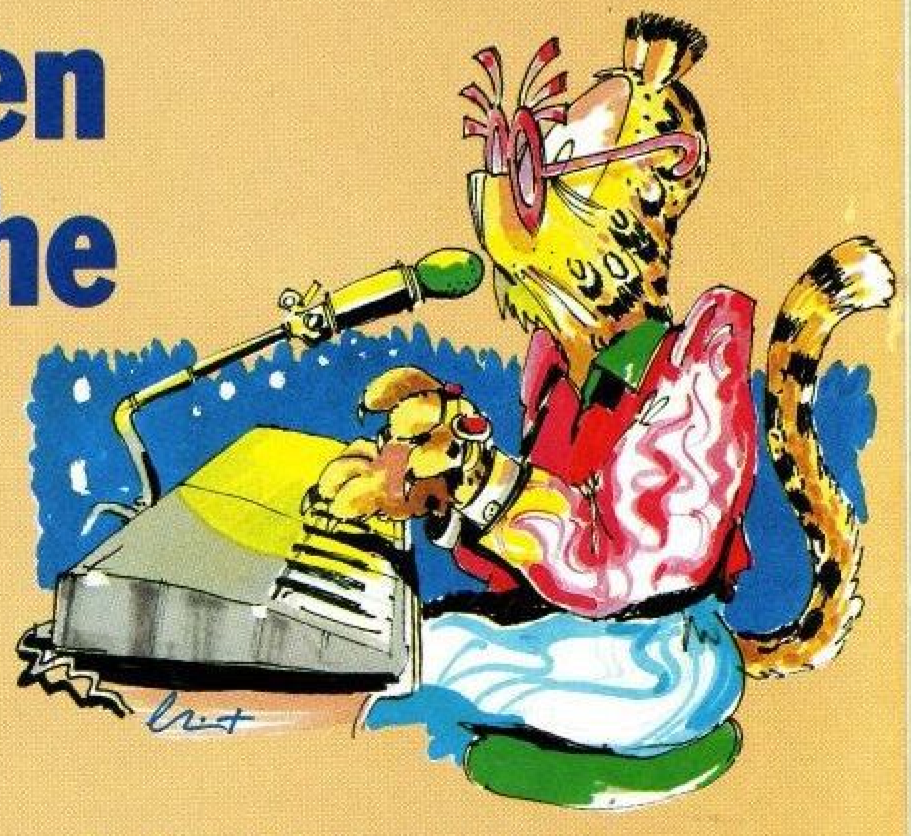
It is impossible to fault the implementation of BBC Basic on the Amstrad. It's fast and has tons of memory. Don't expect masses of software to be written specifically for it though – its a language which you either use from scratch or else do the converting from Beeb-type BBC Basic yourself.

More features could only be introduced by increasing the size of the interpreter – thus leaving less room for programs – and at the expense of slowing it down (due to the time-wasting routines which would need to be included to force the Amstrad to perform all the twiddly bits which the Beeb can manage).

Even if you choose not to use the "Basic" part of BBC Basic very often, you still have the Z80 in-line assembler which can be used to explore the MOS (machine operating system) at the heart of CP/M. However, most people warm to BBC Basic in its own right, and it's probably the best Basic you can have sitting above that unfriendly CP/M.

ACU

Kitten on the keys



If making music is what you seek
And your finance is quite meek
Then Cheetah's keyboard is worth a peek
Or so says our man – Dennis Leek

PAYING around £130 to play tunes on your Arnold may sound unwise: When you get a Cheetah MK5 Midi keyboard and Amstrad mini-interface for your money, it starts to make more sense.

There are already plenty of musical software and hardware products available for the CPCs. Foremost are Rainbird's Advanced Music System, ideal for music students, and Gremlin's EMU, designed for programmers.

On the hardware side, RAM's Music Machine and Cheetah's AmDrum open up the worlds of sound sampling and digital drum machines. Cheetah's MK5, though, is the first product which allows you to play the CPC's sound chip from a full-size, professional quality keyboard, and to interface it with all kinds of Midi musical instruments.

Midi – for those of you who have been left behind by the biggest revolution to hit music-making since the nose flute – stands for Musical Instrument Digital Interface. It's a standard agreed by manufacturers of synthesisers and other musical instruments, which allows them to exchange information.

You can, for instance, link two synths together so that playing the keyboard of one will also play the other. Alternatively, you can use a computer or a dedicated sequencer to store musical information, which can then control any number of synths, drum machines and so on using the 16 available Midi control channels.

The mini-interface (note, mini as in Austin Rover, – not Midi), plugs into the CPC's expansion connector and has a trailing lead terminating in a five-pin DIN plug which connects to the back of the keyboard. The software is loaded from cassette, although it can then be transferred to disc.

Driven from a series of menus and windows, the sound programming software is easy to use and fairly sophisticated. The cursor keys and Enter are used to select options.

Stored sounds

Your first move is to load a file of sounds from the B side of the tape. Selecting the Play option allows you to play the chosen sounds with the MK5. Obviously, having your Arnold linked to some kind of external amplification aids sound quality no end.

Up to three notes can be played at a time, and the 64 available sound "patches" can be extensively edited using a graph display. Attack rate and step, decay rate and step, sustain level, release rate and step, tremolo speed, depth and delay, and various pitch repeat envelope parameters can all be edited.

A split point can be set so that different sounds are played from each half of the keyboard. Your edited sounds can then be stored to tape or disc, in banks of up to 64 at a time.

The display sometimes gets cluttered with unerased windows – these can be removed by returning to the main menu. Otherwise the software is quick and easy to use, and can get some good results from the relatively limited CPC sound chip.

Cheetah outpaces Lynx

If that were all the MK5 could do, though, it probably wouldn't be worth the investment. The fact is that the MK5 is a professional Midi master keyboard at a price which makes the £250 – £1500 price tag of Yamaha, Casio or Lynx products look sick.

The MK5 isn't a musical instrument in itself. It doesn't create any noises. However, it can control any Midi equipped synth. This makes sense when you consider that synths such as the popular Yamaha DX100 and Casio CZ-101 feature difficult-to-play miniature keyboards. And, in the case of Midi sound modules such as the Yamaha FB-01, Korg EX-800 or various sound samplers, no keyboards at all.

It's cheaper in the long run to buy these keyboardless modules, and control them all from one master unit such as the MK5.

The MK5 has five octaves of full-size keys, and is housed in a strong metal case. On the back are the Midi output socket – a standard five-pin DIN – and power connector (the unit needs a 9V power supply, which is provided). On the top is a sideways-mounted pitch bend wheel, the Program/Play switch, four LEDs indicating Channel, Octave, Program and Program Mode, and a three-figure eight-segment LED.

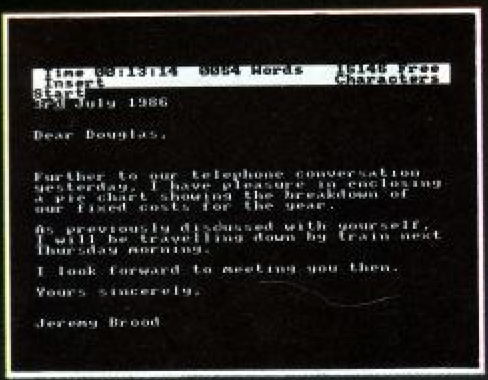
Where, you might ask, are all the other controls? For economy, the top octave of the keyboard doubles as control keys: Just go into Program mode using the Program/Play switch, then use the keys to change the Midi control channel (1–16), Octave (+– 1 octave), Synth Program Number (1–128) and to transmit program changes.

The MK5 has only two problems: It will not transmit velocity information (so velocity-responsive synths will not play louder if you hit the keys harder); and it does not have a modulation wheel for introducing effects such as vibrato. The synth's own controls will normally provide this, though.

The MK5 has dozens of uses in any Midi-based home recording set-up, and so is likely to appeal to budget-minded musicians of all types, not just Arnold owners. If you already have Midi products such as EMR's Midi interface and software, it will help you to build up a computer music system to be proud of.

Product; Cheetah MK5 Midi keyboard and Amstrad mini-interface Supplier; Cheetah Marketing, Norbury House, Norbury Road, Fairwater, Cardiff. CF5 3AS.

All this in just

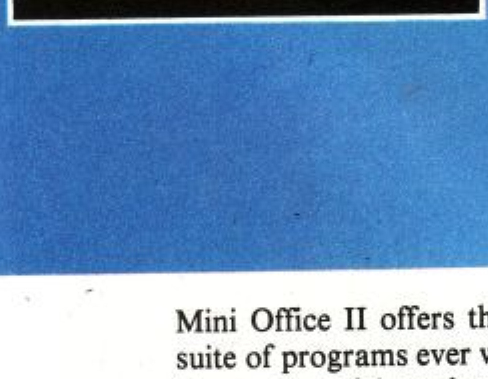


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...and at a price

Mini Office II offers the most comprehensive, integrated suite of programs ever written for the Amstrad – making it the most useful productivity tool yet devised.

A team of leading software authors were brought together to devote a total of 26 man years of programming to the development of Mini Office II. What they have produced is a package that sets new standards in home and business software.

The sample screenshots above illustrate just a few of the very wide range of features, many of which are usually restricted to software costing hundreds of pounds. Most are accessed by using cursor keys to move up and down a list of options and pressing Enter to select.

Is it that easy to use? Several leading reviewers have already sung its praises on this very point.

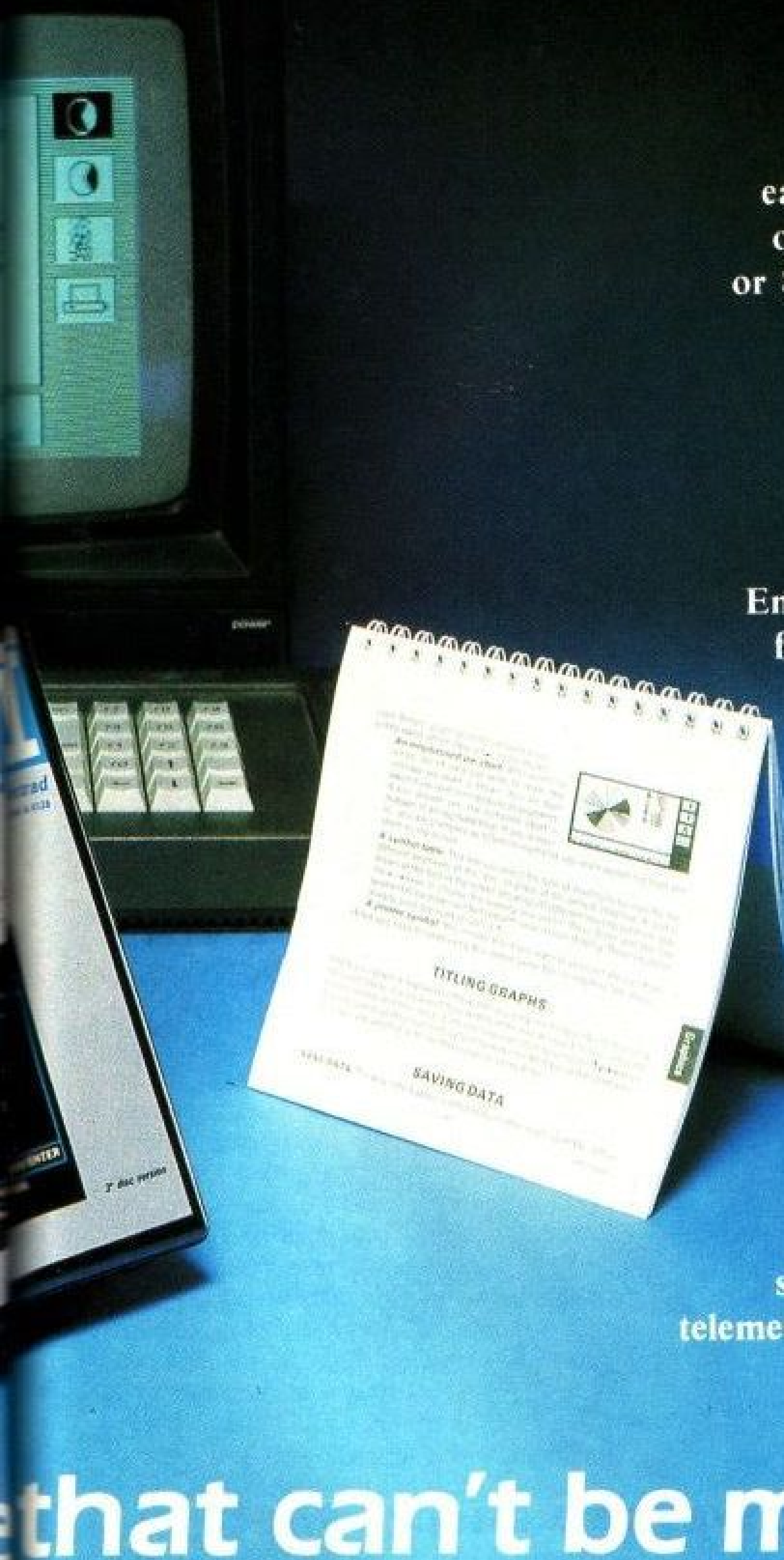
Yet possibly the best advertisement for Mini Office II is that it comes from the same stable that produced the original Mini Office package back in 1984.

That was so successful it was shortlisted in two major categories of the British Microcomputing Awards – the Oscars of the industry – and sold in excess of 100,000 units!

It was up to Mini Office II to take over where the first Mini Office left off, with 32 extra features, two additional modules, a program to convert existing Mini Office files to Mini Office II format, and a 60 page, very easy to follow manual.

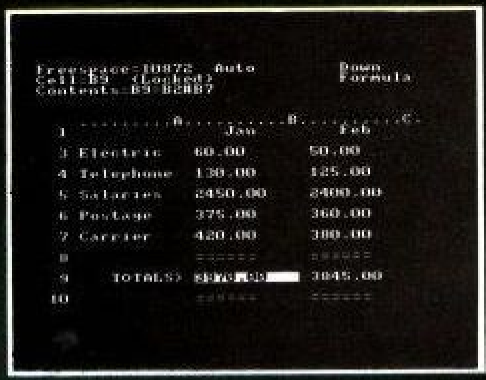
This is the package thousands of Amstrad owners have been waiting for – and at a price everyone can afford!

ONE package!



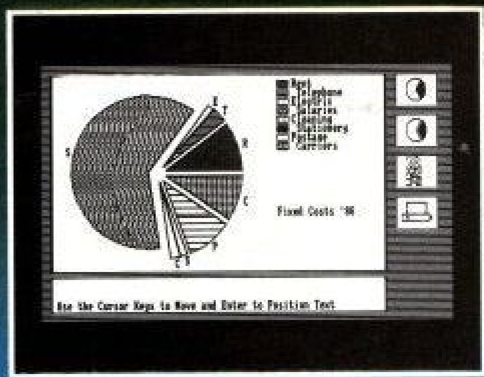
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that can't be matched!

The black art of programming



One of the best ways to ensure that bugs do not creep into your programs is to set about writing them in the right way. Rupert Goodwins speaks with the voice of experience.

I bet you know how to program. Every CPC goes out wired for Basic with a fat book on the delights of the DATA statement thrown in. You might even be one of the adept, churning out code on the assembly line.

One of the mainstays of micro magazines has long been the Learn Yerself Progging series of articles – *ACU* is no exception. And thanks to the Government's "Micro in every school" policy, there's no shortage of people about who can throw together a 10-line program without a second thought.

But there's a world of difference between knowing how to program, and knowing how to write a program. It's the difference between knowing how to lay bricks and plumb a house, and being an architect. Program design is a useful skill to have if you only program for yourself: It's essential if you ever write programs for, or with, other people.

A disciplined approach to writing programs sounds like No Fun. One of the nice things about Basic (and increasingly assembler) on home computers is the interaction – you can try out an idea, run it, tweak it and generally fiddle with it until it seems right.

Each time you make a change, you can run the program immediately and watch what happens. Sitting down and thinking about the fiddly details before touching the keyboard might seem a dismal prospect. But if you want a really dismal prospect . . .

"Great game", says the letter from Fogsparrow. "Really liked it. Any chance of a Spectrum version? Well give it to a conversion house if you don't feel like twice as many royalties.

"And by the way, when the laserbolt goes through the chocolate Ninja on the 17th level, your spare toothbrush explodes and you can't then get past the giant Tebbit on level 42."

You stare at your lovingly-crafted 40k of assembly language, representing six months of late nights and 30 gallons of coffee. Where is the chocolate Ninja routine you wrote 10 weeks ago?

And converting it to the Speccy would mean a complete rewrite. The screen's all different, and the sound . . . Perhaps a few comments would have helped, after all.

Take two. Upon opening the letter, you skip nimbly to your computer. A quick search through the file containing the collision detection and general destruction bits reveals an elementary mistake, where the instruction commented as "Kill the rotter" clearly wipes out your toothbrush, if you're on level 17.

That done, you test to make sure that the bug's fixed. Then you look at the file which contains the code to write stuff on to the screen. It will take you about a week to write a new one for the Spectrum, and a similar length of time for the keyboard and sound modules.

You run your word processor. "Dear Fogsparrow. The bug you reported is now fixed, and you can have a Spectrum version in about a fortnight. Let's talk about money."

OK, I exaggerate a little. The point is that if you follow certain rules at the beginning of any major (major = you have to think about it) programming project, you'll have a much better program at the end of it.

Better in that it can take minutes to find and fix bugs, rather than days, you can often reuse part of the code for a new project, you can go back to the

program many months later and still be able to understand it, and so can other people. And it really does make for less work. Honest.

A few of the more important rules (in no particular order) are:

1 Have all your design done before you start coding.

2 Divide the program into small, separate tasks.

3 Be consistent with names, methods and conditions.

4 Be straightforward, at least in the beginning.

5 Hide things away from different levels.

6 Document as you go along.

7 Spot any possible areas of change, and keep them easy to alter.

The first rule might seem a little obvious, but it really is important to resist the temptation to knock out a few routines before finalising exactly what the program is going to do and how it's going to do it.

You might be able to combine two functions into one, but if you don't spot this until you've written them both then you've wasted time and effort.

And this leads to the next rule. Programs tend to be awesomely complex things, and programmers can only really think of two things at a time (one of which is programming). So a program to edit text splits into subprograms.

One gets stuff from the keyboard, one puts it to the screen, others organise the areas of memory which hold the data, do things like block move and search, and move the cursor around. The cursor routines have to be able to spot the beginning and end of the text, likewise lines, and understand things like tab characters.

It's likely that other bits of the program, like the memory organisation, will need to know about the beginning and end of the text: Still others (like justification) have to have an idea about ends of lines.

So there's a chance that a routine that just tells whether a bit of the text is at the end of a line or at the end of the data will be useful more than once. Write it, and debug it, and you've got a useful building block which you won't have to think about again.

Get enough of these building blocks done and tested, and the chances of you producing a working lump of code are much improved. Rule 3 helps. With all programming languages you're likely to meet on the CPC, you have to give names to things.

Most of the languages can happily cope with up to 16 character names, so calling something INVADER_X_POS is just as possible as Z31. And makes more sense when you're looking at old code from last year.

The same arguments go for naming routines. Which of these identical routines below is easier to understand?

Hopefully, even if you don't know Z80 mnemonics, you'd have a good idea what was going on in the second routine.

Obviously, all the things like START_OF_AREA and END_OF_AREA have to be set up beforehand. It's a good rule to do all that sort of thing in one section of the program, so if you later want to change (say) the end of your playing area, all you have to do is modify one line.

If you've used a number all the way through the program, then you'll have to find every occurrence and modify it. Sounds like work to me. Most languages can be used in either quick-and-dirty or verbose-and-informative mode. Yes, even Basic can be laid out in a structured way.

The rule about being straightforward might seem a little condescending. But it does help to write any new stuff in fairly simple, easy-to-read code first. That way, any nasties can be tracked down and killed easily and without affecting too much else.

When it works with everything else you can spend time making it faster or smaller. If you've kept everything nice and modular then replacing chunks will be painless.

Another way to ease the pain of writing perfect programs is the old information-hiding ruse. Based on the "need to know" principle, it means that only the bits of the program which are directly involved with a kind of action are allowed to mess with that action.

Say there's a routine to change the colours on the screen. It should be designed so that it is the only part of the program that knows where the

```
MAB: ; move till end
    PUSH AF
LL3:
    LD A,(IX+4)
    BIT 4,(IX+1) ; which way
    JRZ LL1
    CMP 35H
    JR Z, BB ; ouch!
    INC (IX+4)
LL2:
    POP AF
    RET
LL1:
    CMP 7
    JR Z,BB ; ouch again!
    DEC (IX+4)
    JR LL2
BB:
    LD A,40h
    XOR (IX+1) ; flip bit
    LD (IX+1),A
    JR LL3
```

```
Move_a_blob:
;
; Move sprite along by one, checking for the end of the
; playing area and bouncing if so.
;
; ENTRY:
; IX = Sprite table of sprite to move
;
; EXIT:
; SPRITE_X_POS field updated
; No registers corrupted

PUSH AF ; save across routine

DO_MOVEMENT:
LD     A,(IX+SPRITE_X_POS)      ; get current position
BIT    FORWARDS,(IX+MOVING)     ; are we moving forwards?
JR     Z, GO_BACKWARDS          ; no, so try and go
                                ; backwards
CMP    END_OF_AREA              ; try and go forwards:
                                ; can we?
JR Z,  BOUNCE                   ; no, so reverse direction
INC    (IX+SPRITE_X_POS)        ; we can go forwards, so do
                                ; so
FINISH:
POP    AF
RET                             ; restore saved register

GO_BACKWARDS:
CMP    START_OF_AREA            ; can we go backwards?
JR     Z, BOUNCE                ; no, so reverse direction
DEC (IX+SPRITE_X_POS)           ; yes, so go back
JR     FINISH                   ; and finish this routine
BOUNCE:
LD     A,SWAP_DIRECTIONS        ; get direction-of-movement
                                ; mask
XOR    (IX+MOVE)                ; and change the direction
                                ; bit
LD     (IX+MOVE),A              ; store it back again
JR     Z, DO_MOVEMENT           ; and move the sprite
```

palette registers are, and everything that changes colour does it through that routine.

Two good things flow from this attitude. Firstly, it's far easier to spot what's going wrong when it does. Secondly, when the time comes to shift the code on to a new machine there's only one thing to modify.

That's also covered by the rule about keeping changeable areas (like screen size and disc stuff) where you can inspect and change them without having to worry about the rest of the code.

Documenting as you go along is a bit of a nuisance. It does mean that you take time to write a three-line description of a subroutine just before the code itself and a short description of what an instruction does nearby.

In some respects Basic and its high-level siblings are what's known as self documenting, so PRINT "HELLO" needs no amplification.

However, `LET A$=(CHR$(CODE(B$(ID))&&64)&CHR$(10))` is a little dense, and an explanatory :REM wouldn't go amiss.

Assembler desperately needs accurate, concise commenting, and so do things like C. If you ever have to fix somebody else's program (and that someone else could be you three months ago), you too will acquire an almost religious devotion to documenting your efforts.

Writing 10 or 20 lines of stuff at a time and filling in the comments afterwards is just about kosher: Leaving routines overnight without a word to cover their nakedness definitely isn't.

And there's a final rule. All rules are strictly optional. There are programmers who can write 30k of machine code in hex, debug it by staring at a nearby vase of flowers, and have a truly wonderful finished product done in a month. Mind you, nobody can touch their code afterwards.

For us mere mortals, who find programming a definite effort, keeping things clean can really make life easier. And if you're part of a team, then there's no option.

ACU

Read all about it

The art of programming has spawned many books, thousands of arguments and ruined more than a couple of friendships.

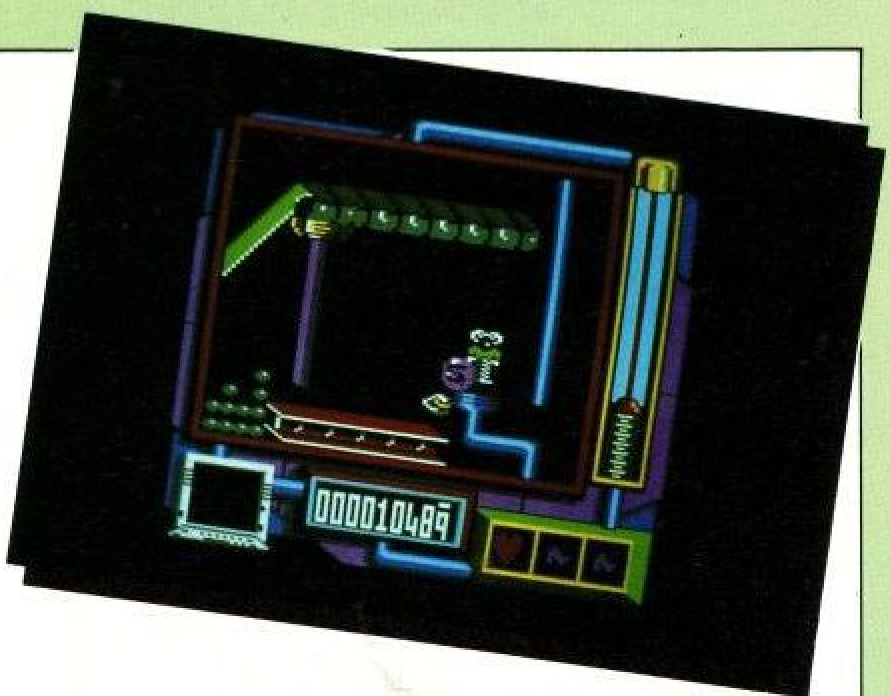
But if you are interested in the ideas behind the practice of programming, you might like to read on. Some of it is quite heavy stuff but it is all healthy and will do you programming the power of good.

A Discipline of Programming, by E. W. Dijkstra, Prentice-Hall, 1976.

Algorithms+Data Structures=Programming, by N. Wirth, Prentice-Hall, 1976.

Elements of Software Science, by E. W. Halstead, American Eisvier, 1977.

● *Rupert Goodwins has been involved with the development of several major projects, including the Spectrum 128 for Sinclair and the Spectrum +3 for Amstrad.*



THING BOUNCES BACK

"Take my advice", Sweevo said to Thing in the lounge of the Exploding Ferret after a particularly trying day. "Don't ever make a success of your first game. They'll want you back, and it won't be easy."

"Oh that's OK Sweevey", said Thing. "I got the Goblin good in the last game. There's no baddy left to bounce. I'm in the clear".

Just then the doors burst open, and into the smokey pub strode The Sheffield Shnozzler, Gremlin's feared contract man. "So there you are, Thing. Have I got a deal for you!" Then he saw Sweevo. "OK you, hoppit. This is company business". Thing gave Sweevo an apologetic shrug (difficult on a spring, but there you go), and turned to the Shnozzler. "I told you Shnozzy. I was quit when I left, and I'm twice as quit now". Shnoz laughed "Let's face it. You're not Harrison Ford. It's our game or nothing." There was a certain logic to this, so Thing settled down to listen, and listen good.

Although you knobbled the evil Goblin, started Schnozzler, his toy factory is an epitome of fiendish Brentwood technology, and completely automated. As a result, it's been churning out more of the monstrous playthings than ever before, and you are going to have to stop it. The factory is easy to enter, but once you're in there are at least nine different alien genotypes (Thing disliked funny words, but Schnozzler was educated like) who are out to get you.

Now you're manoeuvrable, so you shouldn't have too many problems with the platforms and features, but you'll have to get used to the pipe system that serves as transport. This sucks you all over the place, but in certain circumstances you can reverse.

The way to stop the factory is to pick up bits of a computer program "... which are lying around the factory" finished Thing in a tired voice. "How did you know that?" asked Schnozzler. "In any case," he continued, we'll give you good backup. There's a sheet included with pictures of all nine aliens, four bits of computer program and no less than 15 other features of the game."

"How will that help?" said Thing. "Well, the reviewers will read it and be able to write a good review without having to go to the bother of actually loading the game. They like that. They give good write-ups". "Clever", said Thing. "But it won't work for *ACU*." "Nah" said Schnozzler.

The good thing about this game of ours," he went on, "is that it's going to be fast, noisy and colourful. It'll have Iron Chickens, several gremlins called Gerald and Blue Meanies. Hired especially from The Yellow Submarine, those last lot."

"And finally, the clincher. The arguments that are going to persuade you. First, look at these sales figures. Then, look at all these sprites and subroutines we can reuse. Now look at your bank balance."

Thing knew when he was beaten...

Author: Gremlin Graphics
Price: £9.99 (tape) £14.99 (disc)

Nigel

This is a game where things happen fast. That pulsating blob just got your oil. Go down there and you'll be pulverised so fast it will make your skin go mauve. Hit something twice and you might get a bonus, or you might get a bit of superstructural damage. But you have to do it in under half a second.

All that, wonderful colours, natty noises and an almost irresistable do-it-again factor make this a winner.

18/20

Liz

Thing on a Spring is one of my favourite games, marred only by its propensity to get caught in an infinite loop. Thing Bounces Back has taken all the original ingredients and improved them. I know that the coiled character will keep me up until three in the morning, trying to defeat the evil machinery.

As with the original a minor slip is likely to put you miles from where you want to be. As Thing slides down a pipe he looks like a player from Tom and Jerry, the bulge depicting his path. I loved this game, it's escapism, and no-one gets hurt. As good as and as different as possible from Barbarian.

20/20

Colin

My goodness. For once, the fast and furious on the blurb is matched by the game itself. I'm not entirely sure that the over 20's should play this game without being prepared to feel depressed over their slipping reaction time.

And I had a tendency to get stuck in very long loops, where I didn't stop moving but I couldn't break out of a pattern to explore the rest of the screen. That's just me. The game is fine.

18/20

METROCROSS



There is a nightmare, popular among a certain class of animated cartoonists in the sixties, where the dreamer walks along an endless passageway. The only features are the doors (entrances, not the pop group), evenly spaced (oh, I dunno though), and the checkered floor.

Light comes from an evenly illuminated ceiling. As the dreamer walks down this interminable corridor, all he hears is the tap-tap-tap of his feet on the hard surface beneath him. He speeds up, and the doors and the squares merge into a flickering blurr. It only finishes when he breaks down or wakes up. It depended on the cartoonist.

Metrocross is disturbingly like that nightmare. There are differences of course, which serve to spice up the game in the same way that extreme pain spices up the Japanese TV game of Endurance. In that game, competitors are exhausted, maimed, starved, dehydrated, mutilated, and humiliated. In Metrocross the sprite is squashed by giant Coca-Cola cans, bitten by rats, electrocuted (I think...) by underfloor kilovolts and run into the ground. All while trying to run down an almost featureless corridor.

That's not to say that there aren't kicks. For a start, a well aimed kick to a stationary tin can that lies ahead gains bonus points. In fact, any sort of kick will do, from a Lineker 30 yard tap to a Nureyev pas de deux. And then there are skateboards.

Skateboards are good news. A well-timed leap on to one results not only in improved mobility and freedom from a couple of the corridor carnivores, but should our sprite (no name, unfortunately) manage to soar nimbly from one board to another he will generate a mean 2000 points.

Unfortunately, contact with the aforementioned cans and rats, or the unaforementioned hurdles results in suspension of his skateboard license until he acquires another further down the line. And there are no bonus points in the offing if he does that.

Hurdles can be leaped over (as can the rolling cans), but hitting one results in lost time. So does going around the outside, so hurdling is definitely in for Metrocrossers.

There are slight variations to the floor patterning as well. To relieve the monotony somewhat, there are areas of distinct greenery. These, if trodden in, reduce the forward velocity of the intrepid icon by a mammoth 75%. You try running with 75% of a mammoth stuck to your shoe and see where it gets you. On Endurance, probably...

But to help in the great race to the end arch before the time runs out (the aim of this little caper) there are ramps, from which a leaper can whistle through the air for a great distance, proof against all comers. On some levels these ramps are the only features.

And (gasp) there's more, as Albert Broccoli once said to an ageing Scotsman. How would you cope with potholes? Or rotating red cubes? Or funny squares on the ground that blow chromatic streamers up your leg? If you don't know now, you'll know shortly after you play Metrocross.

Author: US Gold
Price: £9.99 (tape) £14.99 (disc)

Nigel

Metrocross? Metrocross? Isn't that where you try and get from the north side of Oxford Circus to the south side without being splatted by one of London's cheery cab drivers? No. Metrocross is where you pound down this corridor until you get to an end marker.

And it's as much fun as it sounds. I managed to get to level 4 on my first ever go. I don't think I'll be playing it again.

14/20

Liz

Ignore what the others say. Metrocross is great, it's got the kind of music you turn up rather than switch off. You feel breathless for your mode 0 sprite after the first level, then there is more. The little man pants with gusto at the end.

It is worth kicking the little cans as you "go for speed up". The scroll is pretty fair, the animation as you leap from ramp to ramp a little flickery, but then there is a lot of screen for the poor little Z80 to move. This has been a good month for games.

18/20

Colin

More arcade conversionery, and this time the graphics on the Arnold are as good as the screen shots ("from the original arcade game") on the back. In this "increasingly impossible" race against English grammar, didacts will note that once you've jammed your joystick to the left and learned how to steer extremely slowly there isn't a lot remaining.

As the blurb says: "Are you the one in a million who can think in microseconds rather than minutes?", 'cos that's the average time from loading the game and recording Tom Jones over the cassette . . .

10/20

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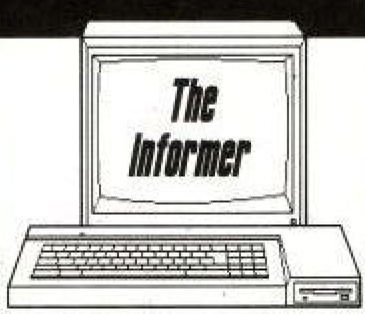
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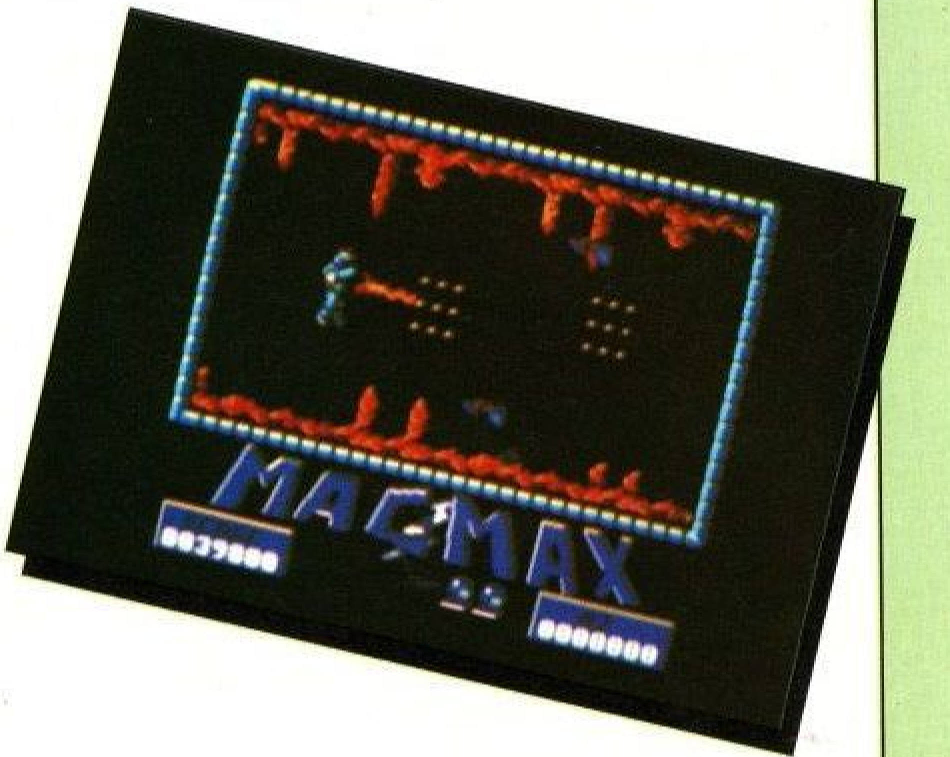
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MAGMAX



MagMax! Not a kind of nuclear powerplant, not a political leader, not even a subtle ripoff of an Aussie film. MagMax is mankind's last defence against the Mechanoid hoards who have travelled unmappable distances from an undiscovered galaxy to wreak unimaginable havoc on the Earth and all her dominions, especially Chiswick. MagMax is the first and last prototype robo-centurian: A feat a little difficult without another 99 robots in evidence. But murmur not. Surely it's time to Save the World. Again.

As a matter of fact, when the game opens, it's all a little late for homo sapiens. There's not many left of them, but MagMax is just as happy about going on a glorious vengeance mission as he would be if there was anything to be protected anymore. One of the last vestiges of humankind to be blown away were the Sci-corps, and it was these brave men and women who designed and constructed MagMax. Well, most of him.

He starts off as a small, jet powered machine. Somewhere in the bowels of the earth lie the components he needs to build up week by week into the complete guide to fishing and fish. Buy part one, get part two and this amazing fish scaler free! From your newsagents now. Sorry, that should have read "build up to a powerful fighting robot, capable of removing the last vestiges of Mechanoids from Terra." Terribly sorry.

Over the landscape he flies, spitting depleted uranium-tipped bullets at the ground enforcements. Some of these look uncannily like pairs of lips spitting red humbugs at the robot, but then Mechanoids always were a little odd. The rest of them at least look the part of the arrogant invaders, with bristling towers and evil blobs populating the surface. These must be cleared before MagMax can drop to the subterranean levels for the parts he seeks.

As he obtains the add-ons from the Moho's equivalent of Halfords, his strength, stamina and firepower all go up. He is thus able to better fight the incoming masses – one day a Mega-Zap molecular debonder, the next a Repello-wall chest shield with positron deflection circuits. It all helps. One of the first items on the itinerary is the special lance in his weapons system. Most ne'er-do-wells succumb to a quick blast of Super Laser, but some need to feel the breath of the Lance before they will lay down and die.

Needless to say, all this body–building has not gone unnoticed at Mechanoids HQ. One minute they were busy planning the horrendous expense of crossing yet another galaxy to lay waste another planet, the next they were under attack. They soon cottoned on to the undeniable truth that something had to be done.

So now, every time our hero MagMax finishes a level stronger, faster and more lethal, the leader of the Mechanoids is waiting for him. Only by utterly defeating him time and time again can MagMax make the grade and free all Earth from the slimy grip of the Invaders!

Author: Ocean/Nitchibaten
Price: £8.99 (tape) £13.99 (disc)

Nigel

This arcade conversion has the look and feel of a reasonable quality game. A standard mishmash of ideas are mixed around, and the result is something that should give enjoyment to a lot of people. It starts like Zaxxon, but soon progresses to something with a little more depth. Not one of the world's mega-games, but a nice try.

17/20

Liz

I found MagMax really difficult to get into. The homing shots were very difficult to avoid, and it was not until I made it to a hole and went underground that I started to sweat *(glow - Ed)*.

The standard zap-everything-that-moves tactic seems to work. It's great if you can build yourself up but I didn't share the enthusiasm of others in the office.

14/20

Colin

Oooerr! Dragons! Usually it takes at most two minutes to remember where I've played the game before: Not MagMax. It's a bit like listening to a record, bits of which have been used for TV adverts.

Still, there's a nice line in problem-solving sequences, lots of simple zapping and quite a lot of fun all round. It has most of the things I carp about when other games miss them. So why aren't I more excited?

16/20

BARBARIAN

"... and lo, a mighty warrior shall come from the frozen wastelands of the north, and he will stand alone against the forces of darkness..." The Book of Death (2nd ed.)

His name was Albert, and he was northern wasteland correspondent for the Manchester Guardian. It wasn't his fault that when he wandered south to the Jewelled City he was hailed as the last chance to defeat the evil sorcerer Drax. He had it in mind to do a comparative review of social service conditions in the City and up north. The people of the City itself saw him as the warrior who was to fulfil the ancient prophecy in The Book Of Death.

A little research soon yielded the answers. The evil sorcerer Drax desired Princess Mariana, and had sworn to wreak an unspeakable doom on the people of the Jewelled City unless they delivered her to him. Albert discerned that feminism had no little way to go in these parts. He also wondered as to how someone could swear something unspeakable, but that little question could wait. The matter in hand was more pressing.

Drax wasn't such a bad sort. He did agree that he would drop his demands and go to arbitration if a champion could be found who would defeat his demonic soldiers. To date this hadn't happened. Plenty of strong young fighters with thews of iron and all that sort of stuff have tried, but to a man they've been cut into tiny little pieces and sold as Draxopuss, The Cat Food for Familiars.

And into this delicate confrontational situation strode Albert. In vain did he protest that he was no fighter. Unfortunately, he had recently done an in-depth report on seven body-building courses and could have kicked sand in Rambo's face without a fear. He had also just come from studying an obscure Buddhist sect, whose members wore only purple loin-cloths and carried five-foot swords. The people of the city looked at their pictures of Conan. They looked at Albert. Bingo.

They did agree, after watching him lose three times in a row in a lemon-peeling contest, to let him practise against their finest warriors.



Arguing weakly, Albert was pushed into the forest glade where the warrior was waiting with sword in fist. The fighter's powerful body rippled with hatred. He read the Sun. He was evil. He laughed, easily and emptily. Albert inched forwards. "I'm sure we can come to a mutually agreeable conclusion over this, ah, Princess" he said without much hope. "Arrrgggguh!" said the warrior, his shining chopper humming through the air and burying itself deeply in the ground by Albert's left foot. "Oh dear" said Albert.

A few weeks later the scars had healed and the skin graft looked like holding. Albert was declared ready to go out and do battle with the Evil One's Minions. Into battle he went. The night before, a young maiden had told him that if he was to kill all the baddies, including finally the monstrous Drax himself, she could get him a job on the Independent. Albert was indeed ready to fight to the death.

Author: Palace Software
Price: £8.95

Nigel

You can move the joystick about in eight directions, with or without fire pressed. These result in 16 fighting moves against your opponent. Six full body hits by either person results in death.

Yes, it's one of those fighting games, but instead of monks or knights beating each other to a pulp it's barbarians. There is absolutely no other difference in graphics, gameplay or plot (plot?) Buy this game only if you have no other martial arts program and can stand the cover. I fail on both counts.

12/20

Liz

Barbarian is the best blood and thunder game I have ever played. I thought Shockway Rider was sick until I beheaded the foe in Barbarian. As his bonce bounces to the floor the decapitated body falls to a kneel and then collapses on to the floor, spurting blood from the neck all the while. Yeeech!

This kind of game is made on the quality of the animation, the number of frames which go with each movement. Palace has always been a master of this craft.

Not a game for those with weak stomachs. I'd buy it in spite of the big an' bouncy Maria poster, I suspect most of you will buy Barbarian because of it.

20/20

Colin

I suppose this is a fantasy game. The only slight flame of interest was kindled when I died for the first time and a rather evil goblin leaped out of the side and dragged my body away. And then all pleasure was lost in a repeat.

The graphics are unremarkably competent. The sound is the best sword-swish and thud I've heard so far. The free poster is amazing, and should appeal to young males between the age of 10 and 12 only. So will the game, I'll be bound.

13/20

HYDROFOOL



Sweevo the robot might just be coming to the conclusion that someone somewhere has got it in for him. After completing his mission on Knutz Folly, where peculiar alien objects attempted to do away with him by stuffing themselves into areas too delicate to mention in a family magazine such as this (documented in Sweevo's World, if you are of a strong disposition), he barely has a chance to oil his joints before being sent on a mission more deadly, more risk-ridden and without doubt considerably damper. The Deathbowl awaits. And the Deathbowl needs a good clean. Step forward robot Sweevo.

According to the Galactic Aquarist, "the giant planetary aquarium called Deathbowl is now so polluted that the only remedy is to completely empty it of water by pulling each of the four main plugs in the right order". At this point the resemblance between the Deathbowl and yer common or front-room aquarium begins to waver at the edges.

Each of these plugs is activated by special objects, which may be divined by the surrounding floor-plates. The objects are either lying around being guarded, or form part of some of the inhabitants which have therefore to be eliminated prior to the great dealgification. As is so often the case with galactic aquaria, there are caches of weapons hidden in numerous places, and Sweeves will have to find them all to complete the clean.

The Deathbowl is set out as a series of underwater caverns in levels. To cross between cavern one merely swims through the holes, but going up or down levels requires a bubble to ride on to go up, or a whirlpool to get sucked into to go down. Fans of American slang will appreciate the significance of the whirlpools . . .

Fish fanciers will by now consider Sweevo's task a reasonably danger-free, if not exactly pleasant, one. The greatest hazards faced when cleansing a terrestrial tank are usually getting a spot of slime on one's anorak, perhaps being nipped on the little finger by an angry Chinese Nostril Carp, at worst getting a mild shock from the heater where the cat's chewed the cable.

But have we not mentioned that the Deathbowl is as far removed from these domestic pleasures as a game of Galactic Black-Hole Roulette is from a beetle drive down at St Mary's Vicarage? Well then.

The most present peril is the old problem, known as the Morris 1100 syndrome, that metal (Sweevo) rusts when brought into contact with water (the Deathbowl). Oil can halt the process for a while, but first you have to catch your can. But even the most well-oiled automaton is no great shakes at bowl-cleaning duties if he's been eaten by a fish, clamped by a clam or whapped by a worm. These latter critters are close relatives of the alien objects we were so careful not to describe earlier, and can just as easily give a young robot a nasty shock.

Filmed in wonderful Hydromation, this piscean jaunt is designed to have you rolling in the isles, floundering all over the plaice and bubbling with laugher. Sea if you don't have a whale of a time.

Author: FTL
Price: £8.95

Nigel

Sweevo's World made me laugh with its mixture of Monty Python and Benny Hill meeting Knight Tyme. The software manager at Sinclair Research said it all about that game – "There's something peculiarly repulsive about having a finger stuck up one".

Hydrofool is more of the same and better. In the current market, where so many games are weak clones with nary a hint of serious design and originality, any attempt to do a real follow- up with humour and quality should be applauded. I'm applauding.

18/20

Liz

I wasn't that much of a fan of Sweevo, in fact the only game I have really liked from FTL was Lightforce. In Head over Heels I felt compelled to play on, I wanted to solve the game and explore all the rooms. Hydrofool left me cold.

Sweevo is HHGTTG Marvinesque. The rising bubble trick has been done before, the graphics are well designed but fail to make the most of the four colour mode. Average.

11/20

Colin

As games get thicker on the ground, programming teams get more experienced. FTL knows how to put together a good game, and Hydrofool is a fine example. The graphics are striking in places, and the little dashes of wit and wisdom (Don't feed the Wolffish) don't hurt at all. Asking me what happens when the final plug is pulled will be fruitless – I haven't got that far. But I'm working on it.

17/20

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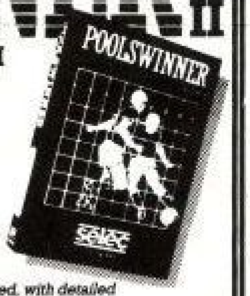
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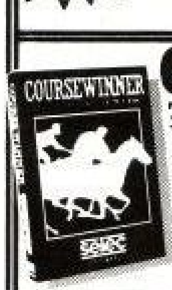
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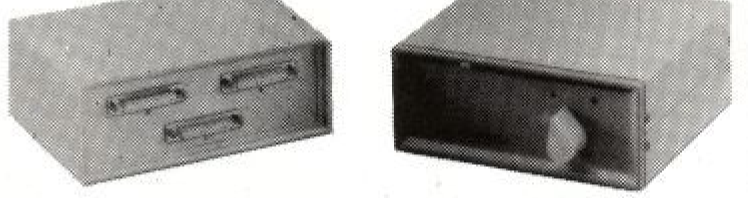
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SABOTEUR II

According to the rubric, in this sequel "you take the role of the Ninja's beautiful sister". No doubt she'll be after you to get it back shortly, but just at the moment she's busy avenging her fatally wounded (but not beautiful) brother.

He got his bucket kicked while infiltrating the dictator's central security building to steal a computer disc containing a list of rebel leaders. It also happened to contain details of the glorious leader's huge missile silo. Reflecting on El Dicto's peculiar filing system, our heroine goes for a good venge in the murky passageways surrounding the huge missile.

The game opens on a hang glider from which the Ninjarette is suspended. A quick drop later, and she's ready to do battle with the security system. This depends on massive android guards with flame throwers, deadly black pumas and those mainstays of security forces around the world, the vampire bats. And you thought the disc filing system was a bit odd.

Readers with a penchant for David Attenborough might imagine that the fearless and highly trained guardbats wait for intruders to settle down for a quick kip, then swoop down and suck 'em dry. As your average vampire bat consumes some 10 millilitres of blood per day, there would need to be about 350 to really finish off the victim within 24 hours. A force to be reckoned with, but it doesn't bother the lady.

The silo cum command centre is situated atop a remote mountain. Within its walls lie some 700 rooms, in which can be found bits of paper tape. When joined together, these pieces hold a new launch program for the missile which redirects it away from its original target. What better way to avenge a dead sibling, especially when (as now) you get paid to do it?

As befits a Ninjarene, the old one-two-kick and physiognomy-mashing phist are second nature to the lass. There are other, more substantial, weapons to be obtained in the cavernous interior of the silo. Nothing quite as pokey as a flame-thrower, but more useful than bare knuckles against the ferocious bats.

There are various computer terminals around the place controlling the lift, perimeter fence and the missile itself. A little hacking will smooth the path to a successful denouement. Following the reprogramming of the whoosh-bang-nasty, an escape in the classic style must be made.



A motorbicycle awaits the lady as she scarpers from the scene. Astride this, she can whizz down the only exit tunnel to freedom, money and a bonus 10000 points.

There are several levels of difficulty, only the most complex of which actually results in the diversion of the missile. As each mission is completed, you are provided with the codeword for the next one.

Will the Avenging Angel pass the panthers, fox the flamethrowers, befuddle the bats, mess up the missile, mount the motorbike and tear off through the tunnel? Or will she suffer a surfeit of alliterative angst and fail? If I was the dictator, I'd be worried. Heroines really screw you up.

Author: Durell
Price: £7.95 (tape) £11.95 (disc)

Nigel

I chose the colour screen option, 'cos I've got a colour monitor. Now, I know that subterfuge usually takes place during the hours of darkness, but black figures against a dark blue background is taking verisimilitude a wee bit too far. Still, I struggled gamely on with the usual kick/duck/punch against flickery foe, but not being able to see a thing took the edge off the excitement. On penetrating to a better-lit cavern, I realised that I hadn't been missing much. Ah well.

13/20

Liz

Durell games have a special feel to them, they are original and use larger than average sprites. Technically Sab II is very clever, but the display chugs a bit – though once you start to get really into the game this doesn't matter too much. I quite liked the idea of a heroine, but found the colour scheme bad for the eyes. This is the best ladder and platform karate game I've played, it is just a shame that our WAFF cannot handle more than one weapon at a time.

18/20

Colin

If you missed Sab I you can avail yourself of the free game coupon stuck to the rear of the insert. Truth to tell, I would choose another of the titles on offer. This is a little below par. The graphics are big and juddery, the plot and action well-worn and hackneyed, and the old playability index well down. It might make a good budget game. And then again . . .

14/20

NEMESIS THE WARLOCK



Nemesis the Warlock is the latest in a series of comic-book adaptations. To be more specific, it's the latest in a series of adaptations from the once-wonderful 2000 AD, home of Dredd, Rogue Trooper and other futurist confections.

Nemesis' role in the eternal struggle between good, evil and the income tax man lies in his fight against Torquemada, Grand Master of Termight. Torquemada must be defeated, and to manage this Nemesis must fight his way to the heart of the Torquemada Empire (Is your father from Falmouth? No, but I've got a Torquemada).

Rule 17 of the Bad Guy's Handbook says that Good Guys must be attacked by "a selection of underlings, of which some or all may have mystic powers". In this case, the underlings deployed by Walque-Torque are his Terminators. These have the interesting property of turning into Zombies if they are left to lie in a state of death for too long. Not your ordinary, mind-if-I-pop-in-for-a-cuppa, type Zombies but those of the scythe-wielding variety. Tricky blighters who can be a little difficult to dispose of.

Dead bodies in any case are vital to the Nemesonian cause. To exit a screen (composed of a set of platforms at various levels), Nemesis has to pile 'em high and pile 'em deep. At some point the resolve of the remaining Terminators will be seriously weakened by this scene of carnage, and Nemesis can wander around looking for the hidden exit.

In fact, there's a good chance that the exit for which he searches will only be accessible if he's piled enough corpses in the right place, and isn't squeamish about tramping all over them. But we all know what happens to dead Terminators, don't we?

Nemesis can convert live Terminators into dead stepping stones in a number of interesting ways. His mainstay is his trusty sword, Excessus, who is a fully signed up member of the Armaments (Blood Drinking) Union and committed to widespread death as a matter of policy. Another way of involuntary euthenasia for the Terms is to pick up weapons and ammo that lie around the place. And finally, once per screen, Nemesis can void a gutful of acid all over the place, killing everything that the stuff touches.

The physical appearance of Nemesis, if you haven't read the strip, is just a teensy-weensy bit odd. His head is shaped like a cross between an antelope (horns), Thrust Two (front) and a Philips pre-war radio (speaker grill). The bargain basement psychologists out there can now spend a happy hour speculating on whether it was this peculiar appearance that lead to him taking up a life of death. The rest of you should pay attention as I describe the denoument.

The longer Nemesis takes to exit a screen, the stronger grows Torquemada's influence and the more Zombies appear. And as time goes on generally the spiny fingers of El Torquo close ever tighter on Nemesis' heart, until squipppblobble! The brave warrior dies of coronary enfistment. But that won't happen, because Nemesis will Get There First, and Right Will Triumph. It says so in the rules.

Author: Martek
Price: £8.95

Nigel

"Porterhouse Cambridge, your starter for 10. How many computer games have used the word Nemesis in the title?" BZZZZZ! "Porterhouse Brennan". "Errr . . . 36". "I'm sorry, the correct answer is one more than when I started the question".

And so it goes: At least these guys have an excuse because they are doing a comic strip adaptation of that ilk. Less easy to excuse are the dodgy graphics, the lame ideas (C'mon, how long did they spend on the plot? Two, maybe three minutes?).

If the sprites were changed (maybe not even then) this could be any other game. 2000 AD doesn't enter into it.

14/20

Liz

Nemesis is a game with a good deal of atmosphere which goes to compensate for the mediocre graphics (strange, the title page is great) and game design. It's biggest attraction for me was that it introduces the Nemesis character to the unenlightened. I hadn't discovered the joys of 2000 AD before this came in for review. He is a goodie with all the hallmarks of a Dr Who baddie. The terminators tumble spectacularly when they get hit by your bullets. Just remember to watch your step on the higher levels. A game for the Nemesis devote.

16/20

Colin

Tumtetum. Our pal Nemesis is an odd shape, and he's got a very funny walk indeed. Worse than that Cleese chappie. Intellectual requirements – nil. Once you've killed lots of enemy, you find the exit by wandering randomly about the place.

Sometimes I get so depressed about this job . . .

13/20

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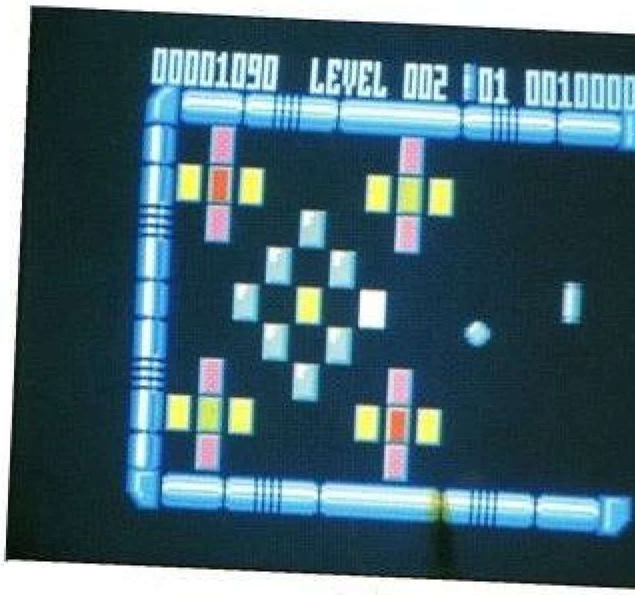
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KRAKOUT



Describing this game isn't going to take long. Anyone over the trigger age of 22 will spot what's going on immediately; those of fewer years might need a bit of jollying along before twigging. Let's go.

There are three main components, a bat, a ball and a few bricks. The bat moves up and down one edge of the screen. The other three edges of the screen are walled in. The ball bounces around off walls, bricks and your bat. The bricks start off life in a group, only to vanish when hit by the ball.

If the ball passes your bat, it's lost. There is a strictly limited supply of these spheres, and when they are all gone the game finishes. There's a score of course, which goes up as bricks get hit. When a complete screenful of bricks gets cleared away, a new screen with a different pattern starts.

"Hold hard", cry the over 22ers. "That's a game called Breakout." Right, of course. Breakout the video game was designed in 1974/75 by a guy called Wozniak for a company called Atari (he got $700 for it, by the way). Here we are, some 12 years later and there have been a lot of pixels under the bridge. One might reasonably expect a bit more out of a colour, 64k, hi-res computer than the original monochromatic collection of 44 mid-70s chips.

Indeed there is. A healthy selection of gimmicks tempts the palette of a jaded intergalactic warlord with an urge to pulverise a few non-sentient entities. Take the Bonus Brick. Not only does this cause extra points to accrue when hit, but it flips over to reveal a special effect. A subsequent hit on this effect causes magic to be worked on the system. Some cause the bat to enlarge alarmingly, some double subsequent scores, some make the ball stick to your bat until you choose to release it. All of them can be used to advantage.

And what game of the late 80s would be complete without an alien or two (who said Gauntlet)? The extraterrestrials in Krakout are all a bit odd, and all have an effect of some sort on you and your balls. Great title for a magazine, that.

The most common peripatetic paranormal is the floating ogre. This just disintegrates when hit, but can impart an interesting vector to your missile in so doing. Other odd bods include a bee that paralyses your bat, a diamond that clones your ball, and pulsating crosses that squirt you through the nth dimension to a higher screen.

There are 100 screens in all, and if you work your way through that lot there's a construction kit available that gives you another century to play with. There's a degree of customisation available from the standard game too; an options screen allows you to select various types of bat control, the speed of the ball and direction of play.

But, all said and done, it's still Breakout at heart. And there's nowt wrong wi' that.

Author: Gremlin Graphics
Price: £7.99

Nigel

Had to happen, I suppose. The name sets the tone precisely, unsubtly derived from the Californian word Breakout *(vb, to spend dimes at the rate of a dollar an hour on a ridiculously over-addictive game)*.

Luckily, Gremlin has also been heavily influenced *(also Californian; musicians' term for spotting easily rip-offable ideas)* by the good bits of the game and has left them well alone. The end product is the best game of this month's bunch, simple to play and impossible to stop. Love it.

19/20

Liz

Imagine cannot really complain about Gremlin using the Arkanoid idea when that in itself is really borrowed from Breakout. The sideways view just makes it look as though it feels guilty. Arkanoid was too fast, Krakout is a shade too slow, but still very playable. I liked the bricks which explode, taking the surrounding ones with them.

The screen designs are good, but there is not really that much to programming another Breakout. I can't believe that Mastertronic doesn't have one waiting in the wings.

19/20

Colin

For some odd reason, nothing provokes me more to a burst of maniacal laughter than striking a particularly good angle in Krakout and watching the ball demolish a good part of a screen with no further action on my part. And the fact that, after a good week of batting around, I've still only got to the twelfth screen only exacerbates my condition.

As usual, Gremlin has various surprises hidden away, making upward progress an interesting affair indeed. How about the double bat that is as likely to propel the ball backwards to oblivion as forwards to a high score? It's all a certain cure for sanity.

18/20

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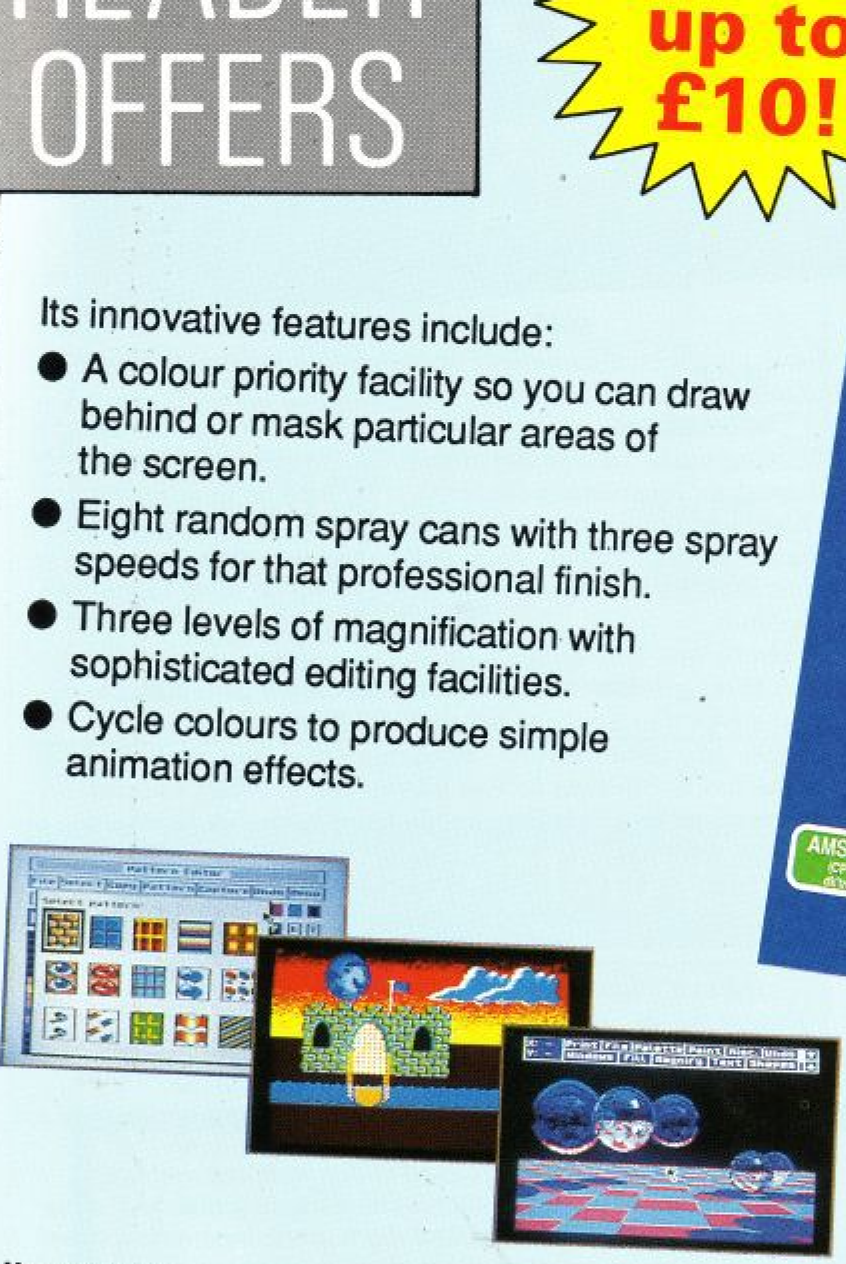
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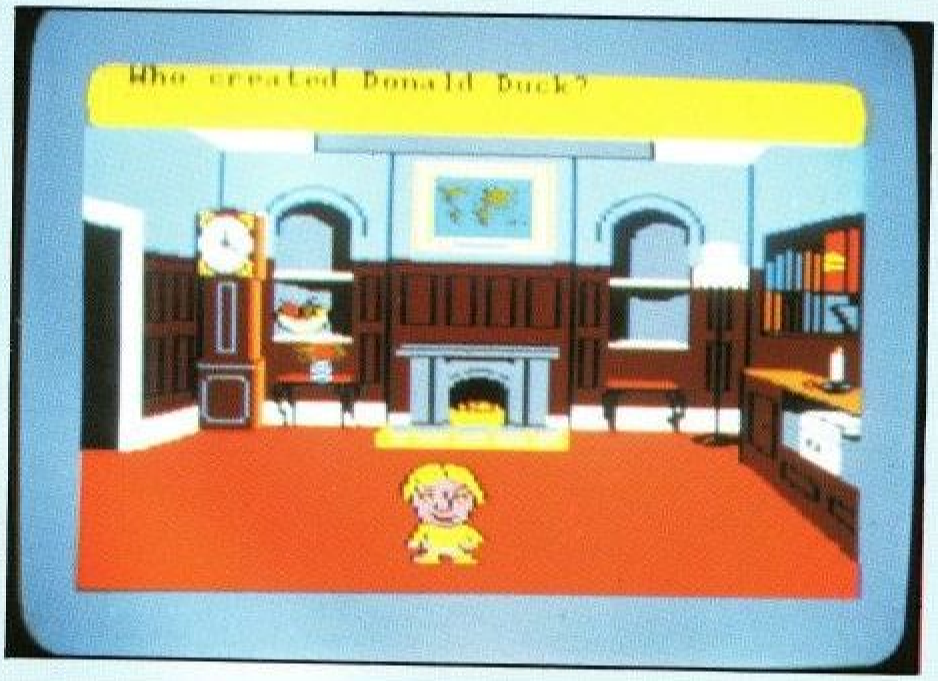
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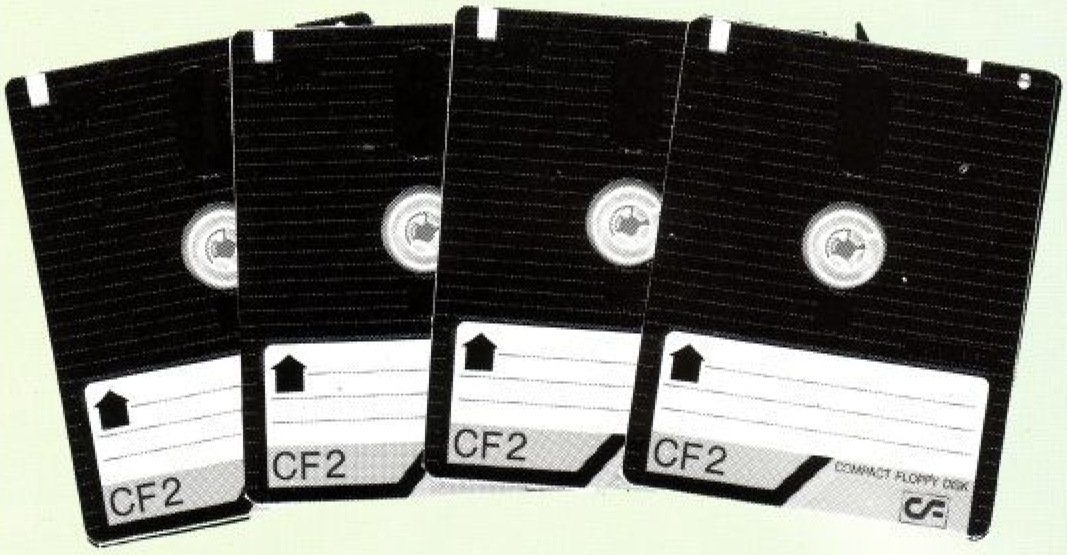
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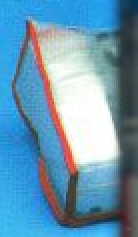
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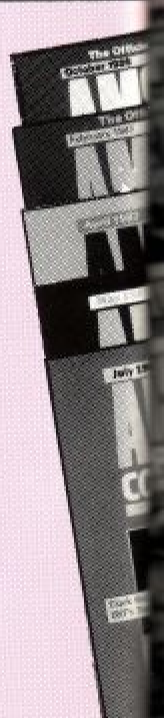
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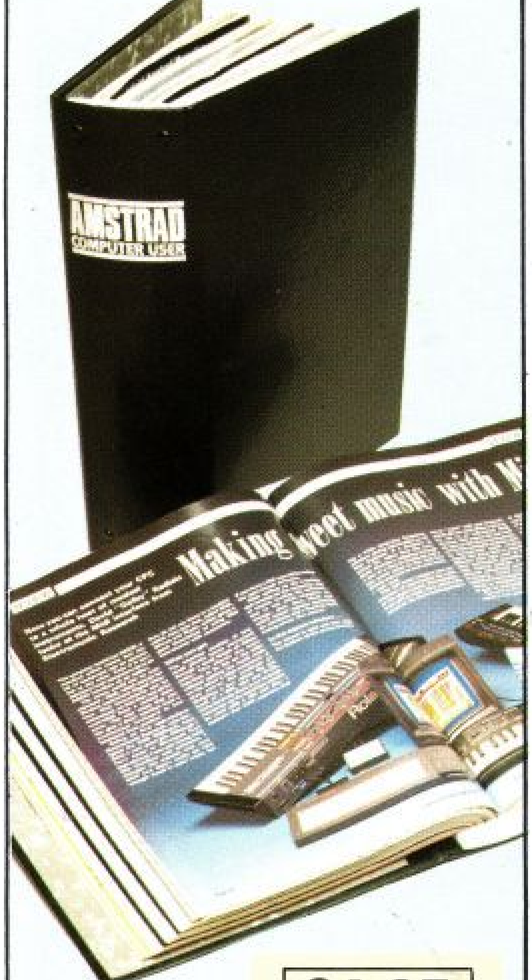


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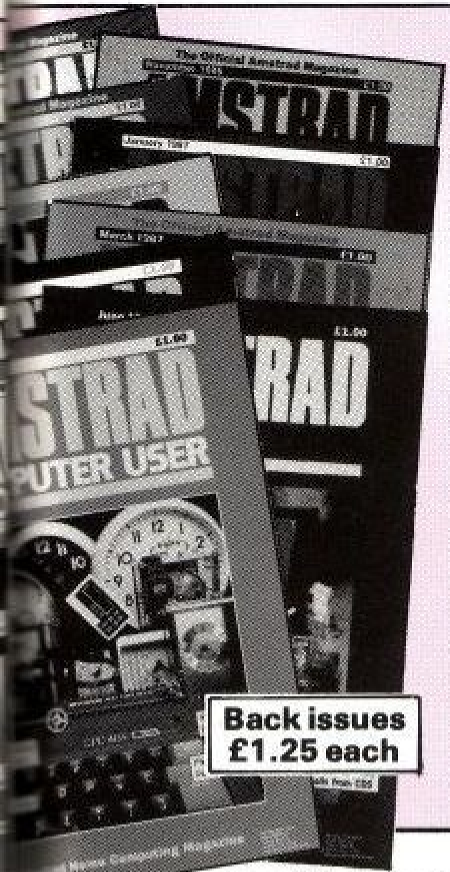
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Such trickery is not unique to Amstrad plc. In the days of Sir Clive, the Sinclair organisation was also guilty of ill-equipping the R & D department. The man from marketing who asked to "borrow" three monitors for an exhibition then sold them to the Russians. Still, back then there was money to burn. Sinclair Germany seems to have had a great time writing off Porsches.

Happy Birthday Peter Roback, I'm told there is no truth in the rumour that you promised to buy drinks in Bradleys wine bar and then went to the Railway Tavern.

Bugs

The US embassy in Moscow is bugged, and the Americans reckon it will cost them $10m to make the place fit for spying. But then as one Amstrad wit quipped of IBM's new operating system (OS/2), "What's the difference between OS/2 and the US Embassy?" Answer. "It might be possible to get all the bugs out of the Embassy".

The race

This is being written at the beginning of June and the big race is on, not the one between Maggie and Neil, but the one between Locomotive Software and Cambridge Computers. Both LocoScript 2 and the Cambridge Z88 were promised for delivery in mid-April, that fell back to May and now into June we seem to be entering the final furlong.

Locomotive stumbled at the sixth with Cambridge failing to negotiate the third. Both are promising "any day now". We will let you know who won, or if the race is still running next month. I hope Cambridge don't withdraw, they've got the ed's money.

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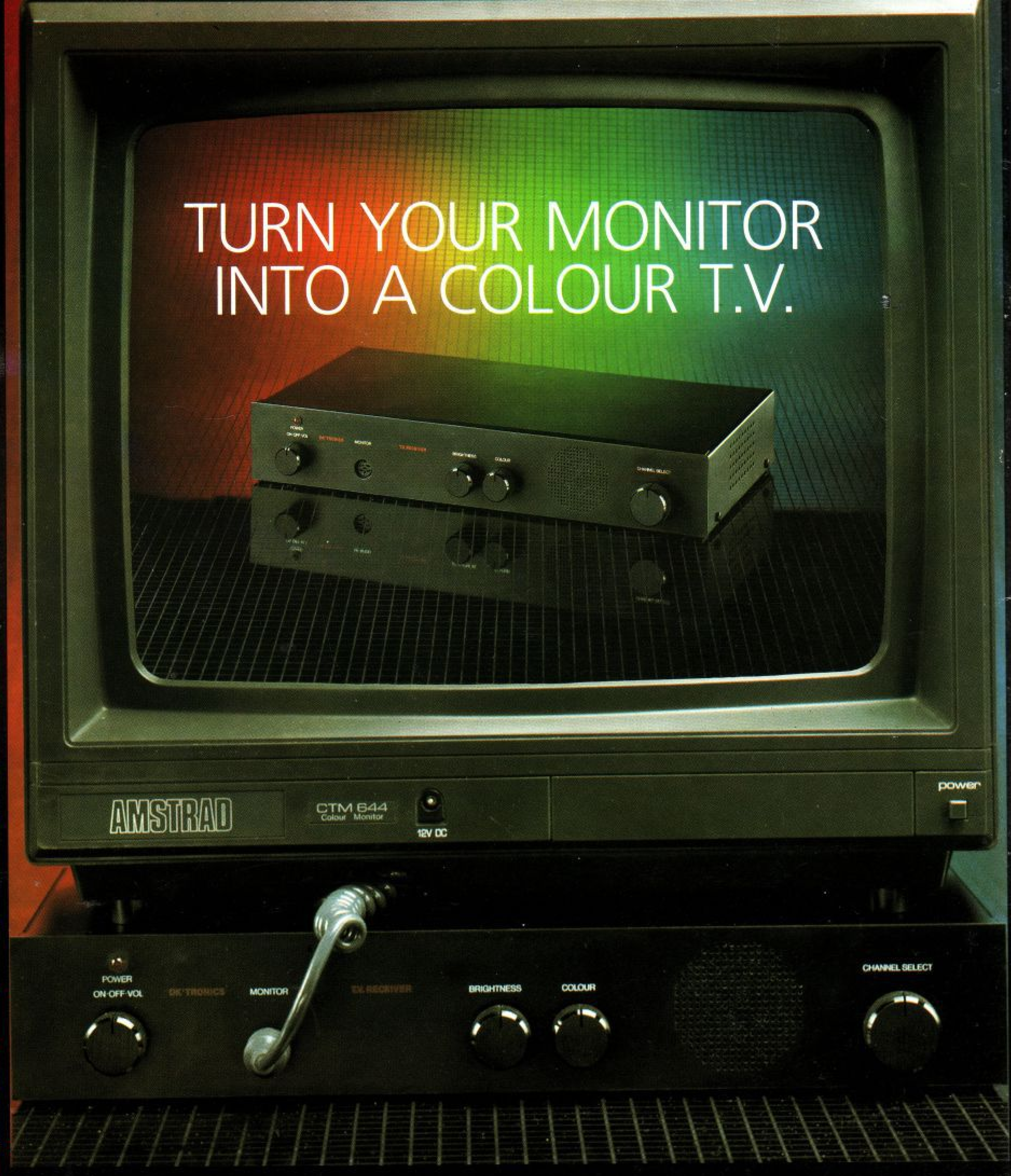
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